Final Report on the Study of the U.S. Department of Energy Office of Environmental Management Implementation of 10 CFR 830, *Nuclear Safety Management*, Subpart B, "Safety Basis Requirements"

Conducted over the period January 28 through May 23, 2002

by
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Disclaimer Statement

The views expressed in this report are solely those of the author and no official support or endorsement of this article by the U.S. Defense Nuclear Facilities Safety Board, the U.S. Department of Energy, or any other agency of the federal government is intended or should be inferred.

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List of Acronyms

ARF	Airborne Release Fraction
ASA	Auditable Safety Analysis
ASME	American Society of Mechanical Engineers
BBWI	Bechtel BWXT Idaho, LLC
BIO	Basis for Interim Operation
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DSA	Documented Safety Analysis
EFCOG	Energy Facility Contractors Group
EH	Office of Environment, Safety, and Health
EM	Environmental Management
EM-1	Assistant Secretary for Environmental Management
HAZWOPER	Hazardous Waste Operations and Emergency Response
ICRP	International Commission on Radiological Protection
INEEL	Idaho National Engineering and Environmental Laboratory
NNSA	National Nuclear Security Administration
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act
RFETS	Rocky Flats Environmental Technology Site
SAR	Safety Analysis Report
SARAH	Safety Analysis and Risk Assessment Handbook
SAWG	Safety Analysis Working Group
SMI	Strategic Management Initiatives, Inc.
SRS	Savannah River Site
TSR	Technical Safety Requirements
USQ	Unreviewed Safety Question
WSMS	Westinghouse Safety Management Solutions, LLC
WSRC	Westinghouse Savannah River Company

Executive Summary

In April 2001, the U.S. Department of Energy (DOE) completed the Rulemaking process for promulgating Subpart B, "Safety Basis Requirements," to Title 10 Code of Federal Regulations (CFR) Part 830, *Nuclear Safety Management.* In that Rule, DOE prescribed that all of its contractors that operated nuclear facilities would need to submit for DOE approval Rule-compliant safety bases by April 10, 2003. Although the predecessor DOE Orders to the Rule had been in place for nearly a decade, most sites were discovered to have significant numbers of safety basis documents that did not meet either the form and/or content required by the Rule. With the cost to prepare, review, approve, and implement a safety basis ranging from $100,000 to several million dollars each, the cost and schedule for achieving Rule compliance is of major concern to DOE line management. The Environmental Management (EM) Subpart B compliance effort will include revising over 90 safety basis documents in the next 10 months at an estimated cost of $23 million (not including the cost of implementing these safety bases once DOE has approved them).

During the period January 28 through May 23, 2002, Mr. Paul Gubanc of the Defense Nuclear Facilities Safety Board Technical Staff was temporarily detailed to the DOE Assistant Secretary for Environmental Management to conduct a study of EM-wide implementation of 10 CFR 830, Subpart B. During the first half of this study, 40 ideas were identified to improve the safety, cost, and schedule of Rule implementation within EM. During the second half of this study, 12 of these ideas were specifically pursued. While none of the 12 initiatives could be completed, 3 were left very near completion (i.e., within several weeks) and 3 others were left with a clear direction, assigned leaders, and funding to complete them by the end of calendar year 2002. The remaining six ideas constituted cross-pollination efforts without specific deliverables. One of the study's initiatives, when completed, may avoid the application of Subpart B requirements to thousands of low-risk EM "facilities" and related costs in excess of $500,000.

In conducting this EM Study, Mr. Gubanc reached several fundamental conclusions, including the following:

1. DOE Headquarters line management leadership is essential to balance safety, cost, and schedule in the safety basis arena. In the absence of such leadership, inefficiencies will occur, implementation impacts will not recognized, and excessively over and/or under conservative approaches will be permitted to proceed unchecked.

2. The safety control methodology of 10 CFR 830, Subpart B, while appropriate for some facilities, does not integrate well with other valid methods. DOE's effort to envelope all of its nuclear activities under one Rule is at best inefficient and, in some cases, may actually detract from safety. Nuclear Regulatory Commission regulations offer several alternative safety methodologies that merit DOE's examination.

3. DOE has not yet tailored the application of 10 CFR 830, Subpart B, to efficiently address overlapping regulatory domains (e.g., Resource Conservation and Recovery Act [RCRA] and Comprehensive Environmental Response, Compensation and Liability Act [CERCLA]).

Currently, controls driven by these other regulations cannot be credited unless redundantly controlled in the safety basis. DOE has already established a precedent to credit other controls in its treatment of certified shipping containers and sealed radioactive sources. DOE line management should lead the effort to credit other regulatory contributions in safety bases.

4. The lack of reliable and trusted cost estimates for safety basis development and implementation is debilitating to sound decisionmaking. Due to some exaggerated claims about the cost of safety basis development and implementation in the past, qualitative and/or experience-based, cost-benefit arguments in support of tailoring requirements are not persuasive to critics. In addition, attempts to introduce cost-benefit ideas into Rule compliance discussions are viewed with hostility by some as ignoble efforts to undermine or bypass safety. Lastly, the negative safety implications of expending limited resources on low-value tasks are not well quantified.

5. Better defining the "graded approach" is only meaningful in technically specific circumstances. This study pursued several efforts and identified several more areas where the need exists to better define an appropriate level of grading to a specific situation (e.g., how to tailor the Subpart B compliance approach for EM inactive waste sites that are already regulated under RCRA and/or CERCLA). Attempting to generically define the graded approach for safety basis purposes is elusive at best.

The study report concludes with a set of seven recommended actions for EM's consideration so as to capitalize on the investment this report entails. While no longer assigned to EM, Mr. Gubanc will remain available for consultation.

1.0 INTRODUCTION

In April 2001, the U.S. Department of Energy (DOE) completed the rulemaking process for promulgating Subpart B, "Safety Basis Requirements," to Title 10 Code of Federal Regulations (CFR) Part 830, *Nuclear Safety Management.* In that Rule, DOE prescribed that all of its contractors that operated nuclear facilities would need to submit for DOE approval Rule-compliant safety bases by April 10, 2003. Failure to comply with this Rule subjects the DOE contractor to potential civil and criminal penalties in accordance with 10 CFR 820, *Procedural Rules for DOE Nuclear Activities.* Under DOE's other nuclear safety Rules (i.e., 10 CFR 830, Subpart A, and 10 CFR 835), DOE has imposed a number of civil penalties, with at least one penalty exceeding $1 million. Given that DOE contracts are typically cost-plus (i.e., costs to achieve compliance are reimbursable but civil penalties are not), DOE's contractors would appear to be financially motivated to err on the conservative side of compliance, although other factors may dominate in specific circumstances (e.g., performance incentives).

Although the predecessor DOE Orders to the Rule (i.e., DOE 5480.21, 5480.22, and 5480.23) had been in place for nearly a decade with almost identical requirements, most sites were discovered to have significant numbers of safety basis documents that did not meet either the form and/or content requirements of the Rule. In addition, other areas of significantly variable implementation (e.g., nuclear material transportation and task-level work planning at remediation sites) were now clearly enveloped by the Rule. With the cost to prepare, review, approve, and implement safety basis documents ranging anywhere from $100,000 to several million dollars each, the cost and schedule for achieving Rule compliance are of major concern to DOE line managers. The concerns are magnified by the observation that until the Rule was issued, the existing safety bases were deemed by DOE to be largely adequate for the protection of the public, the workers, and environmental safety (judging from the absence of DOE-wide initiatives to stop ongoing work or evacuate sites). Appendix A provides an estimate of the magnitude of the Rule compliance effort facing the DOE Office of Environmental Management (EM).

In the fall of 2001, the author was employed as the Defense Nuclear Facilities Safety Board (DNFSB) Oak Ridge Site Representative. As documented in the Site Representative's weekly reports during that period and in subsequent DNFSB correspondence to DOE dated October 15, 2001, the author revealed significant deficiencies with the local EM contractor's safety basis documentation and the DOE and contractor management thereof. These revelations heightened concern within EM as to the level of uncertainty among the EM contractors in their understanding of Rule implementation issues and the resulting costs. As a result of the author's significant involvement with and insights regarding the Oak Ridge EM issue, his extensive operations-oriented experience within EM and at major EM sites (see Appendix B), and the impending completion of his field tour, the Assistant Secretary for EM (EM-1) requested that the DNFSB make the author available for a period of 120 days to conduct a special study.

2.0 PURPOSE OF STUDY

This study was predicated on the following DOE EM perceptions of 10 CFR 830, Subpart B, as it relates to the nature of facilities and work performed within EM:

1. For EM nuclear facilities that pose little risk to the workers, the public, and the environment (e.g., burial grounds, storage vaults, inactive facilities), too much time and money is being spent on planning for and implementing the Rule.

2. Title 10 CFR 830, Subpart B, adopts a paradigm of safety regulations patterned after that used by the Nuclear Regulatory Commission (NRC) for licensing nuclear power reactors. Furthermore, whereas NRC has unique and well-defined Rules for each class of hazard licensed by the agency, DOE has elected to use one Rule to cover a widely diverse set of nuclear hazards and facilities. This has resulted in a situation where each DOE contractor must develop a tailored, or graded, approach for each situation, which in turn requires review, modification, and concurrence by the local DOE field office. Similar situations at different sites have the potential to have different solutions, with differing costs and schedules. This results in wasting money and delaying closure of EM sites.

3. There is a need for accepted interpretations of Subpart B that will allow the appropriate tasks and standards to be employed to conduct nuclear operations and closure activities without jeopardizing public health and safety, the workers, or the environment.

4. EM is under increasing Congressional and public pressure to meet cleanup commitments and effect real improvements in safety. Rewriting the safety documents will result in few practical safety enhancements. Given the scarcity of resources to rewrite these documents, EM may well have numerous facilities that are noncompliant by the April 10, 2003, deadline, leaving its contractors vulnerable to enforcement actions and financial penalties.

As a result of the above perceptions, the author was tasked to identify means by which EM could make its implementation of the safety basis Rule mutually beneficial with regard to safety, cost, and schedule. Due to the urgent nature of the need and the author's limited availability, this study was limited to 120 days. EM-1's memorandum that established the study's charter is provided in Appendix C.

3.0 METHOD OF STUDY

3.1 Key Improvement Areas

When originally conceived, this study was expected to focus on identifying opportunities to share analytical tools and safety basis document models amongst the EM sites. As the study progressed, however, it became clear that most sites had already invested heavily into their own analysis tools and methods; therefore, the adoption of "new" methods would not occur quickly, and some aspects of these tools and methods are site specific and not amenable to use elsewhere. The majority of field interest suggested that the most timely, effective, and meaningful improvements were tied to efforts in the following three areas:

1. Tailoring the regulatory compliance approach to the type of activity/facility of concern and keeping focused on value-added results.

2. Eliminating uncertainty with regard to Headquarters' expectations and administrative processes, especially those from the Offices of EM and Environment, Safety, and Health (EH).

3. Keeping large numbers (hundreds to thousands) of low-risk EM "facilities" from receiving overly conservative classifications as Hazard Category 2 or 3 nuclear facilities, thus reducing the dilution of attention and resources from hazardous activities/facilities that truly merit enhanced analysis and control. (Note: Nuclear facilities that are classified as below Hazard Category 3 are still subject to DOE Rules 10 CFR 830, *Nuclear Safety Management*, Subpart A, "Quality Assurance," and 10 CFR 835, *Occupational Radiation Protection.*)

As a result, the nature and focus of the study was amended at its midpoint with concurrence from EM-1.

3.2 Study Approach

The final schedule for the study is provided in Appendix D. The major elements of the study's approach are presented below in chronological order.

1. The author performed extensive self-study, examination, and discussion with experts of both the DOE and NRC regulatory approaches to nuclear safety. The discussions focused on both the formal and practical application of these regulations in their respective communities. The author's reading list, which provides a sense of the magnitude of this effort, is provided in Appendix E.

2. Throughout the first half of the study, the author compiled a list of ideas and concerns for further evaluation and consideration.

3. Visits were made to major EM sites to meet with DOE and contractor safety basis experts. The primary purpose of these visits was to identify the magnitude of effort required to achieve compliance, identify tools and models for sharing with other sites, and identify each site's concerns and issues with Rule implementation within EM. The agenda used for these site visits is provided in Appendix F. Additional EM sites that were not visited were included in the study via electronic mail on most communications and invited to comment.

4. The author evaluated and prioritized all of the ideas and concerns collected during the first half of the study. This included identification of the major insights (see Section 5, Major Conclusions) and those issues deemed most amenable to resolution within the remaining duration of the study (see Section 4, Results of Study).

5. Six EM workshops were held that addressed the topics listed below. In four of these workshops, draft documents were developed for EM-1's consideration (see Section 4, Results of Study, and Appendices G and H2).

- EM processing of Rule exemptions
- Streamlining the safety basis development, review, and approval process and the hazard categorization of EM nuclear facilities
- EM's expectations for the implementation of approved safety bases
- EM-wide treatment of inactive waste sites under the Rule
- Technical tools to improve the quality and reduce the costs of accident analysis
- Treatment of facility disposition activities under the Rule

6. In parallel with the above workshops, the following additional initiatives were started:

   - Creating an EM safety basis web page as a repository for EM Rule exemptions, guidance, and other safety basis-related references.

   - Sponsoring completion of the "DOE Accident Analysis Handbook," which was initiated but uncompleted by DOE/National Nuclear Security Administration (NNSA).

   - Identifying means to improve the efficacy of the Energy Facility Contractors Group (EFCOG) and its Safety Analysis Working Group (SAWG).

   - Formulating and sponsoring a peer-review process to bring finality to a set of alternate Airborne Release Fractions (ARFs) for hazard categorization that were developed but never finalized by EM.

7. The final step was preparation and delivery of the study's final report.

4.0 RESULTS OF STUDY

As discussed above in Section 3, Method of Study, the first half of this study compiled a list of ideas and suggestions for potential use in streamlining implementation of 10 CFR 830, Subpart B, across the EM complex. This list was evaluated and prioritized to select high-value ideas for pursuit during the second half of the study. The entire list of potential ideas is provided in Appendix I, along with the author's explanation and assessment of each idea. Appendix I also includes those ideas that were pursued during the second half of the study and which are discussed below.

4.1 Products

The second half of the study directly generated or prompted the generation of the specific products listed below. The persons responsible for managing each product after the study are identified in parentheses.

- An EM-1 guidance memorandum regarding 10 CFR 830, Subpart B, as it relates to the processing of exemptions, facility hazard categorization, and the implementation of approved safety basis documents. The draft EM-1 memorandum, which entered concurrence on

May 6, 2002, is provided in Appendix G and primarily addresses uncertainty concerns. (Maria Gavrilas-Guinn, EM-5)

- An EM-1 decision memorandum declaring that thousands of EM's inactive waste sites are below Hazard Category 3 nuclear facilities and are, therefore, not subject to the majority of the requirements in 10 CFR 830, Subpart B. The author selected this proposal (with advice by the EM workshop attendees) as the preferred alternative after considering a variety of different options, as represented in Appendix H1. The draft memorandum is provided in Appendix H2 and addresses the concern of over-regulating low hazard facilities, which diverts limited safety resources from higher value work. On May 17, 2002, additional technical detail developed in support of this proposal suggested that there might be a problem with demonstrating compliance to the DOE hazard categorization standard, DOE-STD-1027-92. This issue and other needed enhancements are appropriately annotated in Appendix H2. Based on this issue being identified late, resolution was not possible during the study and is being pursued separately by the individual responsible for completing this initiative. (Shirley Olinger, Richland Operations Office)

- Creation of an EM Headquarters safety basis web page that will serve as a repository for EM guidance and direction, such as exemption approvals and the above memoranda from EM-1. This web page will be accessible from the EM-5 home page, www.em.doe.gov/safetyhealth/. Creating this web page addresses uncertainty concerns. (Maria Gavrilas-Guinn, EM-5, and Mike Kleinrock, EM-7.1)

- Identification and funding of a path forward for dealing with EM-unique nuclear hazards/facilities with regard to facility hazard categorization and alternate ARFs. See Appendix J for a more detailed explanation. This action item addresses the three areas of concern (using tailored regulatory methods, reducing uncertainty, and overly conservative response to the Rule). (Joseph Arango, EM-5)

- Acquisition of funding for completion and promulgation of the draft "DOE Accident Analysis Handbook" that had been initiated by DOE/NNSA. This item is discussed further in Appendix I, Potential Idea T06, and it addresses both the tailoring of regulatory methods and reducing uncertainty. (Dae Chung, NNSA)

- Creation of a formal quality assurance process for the generation of EFCOG documents, especially those in the safety basis arena. While not yet finalized or adopted, the DOE-EFCOG dialogue that prompted this product laid out clear expectations and criteria for the EFCOG's products to be viewed as credible in the DOE community. These expectations are listed in Appendix K. (John Longenecker, EFCOG)

- This final report, which provides insights and recommendations for future EM actions in the areas of safety basis and 10 CFR 830, Subpart B.

4.2 Other Deserving Initiatives

As discussed above, this EM Study selected ideas to pursue based on the perceived value and success the author judged could be achieved. Two other initiatives which this study was unfortunately unable to substantially engage in are those represented in Appendix I, Potential Ideas P02 and P03. One of these involves a joint EM/EH effort to develop complex-wide guidance for addressing the transportation of nuclear materials under the Rule. The other involves a Richland Operations Office effort to define what constitutes a Rule-compliant safety basis in accordance with DOE-STD-1120-98, *Integration of Environment, Safety, and Health into Facility Disposition Activities*. Both of these initiatives have broad applicability, address matters of current interest and need, and are deserving of additional near-term EM emphasis and support.

4.3 Intangible Benefits

This study also generated certain intangible benefits that are hard to quantify as to their value but which are just as important, or perhaps more so, than those listed above.

- Cross-fertilization opportunities and personal contacts across the EM community of DOE and contractor safety basis professionals
- DOE Headquarters improved understanding and focus on generic safety basis issues of significant importance to the EM field organizations
- Restoration of a technically enlightened, vigorous, and balanced dialogue between EM and EH regarding implementation of 10 CFR 830, Subpart B
- Interest and self-reflection from the EM contractor community on how they can more effectively serve the mutual interests of both themselves and DOE
- Excitement and interest from EM field organizations that finally felt as though they knew someone in EM Headquarters who would listen to them, understand their safety basis issues, and demonstrate, through action, the capability to effect change

5.0 MAJOR CONCLUSIONS

The following major conclusions were developed during the conduct of this study:

1. **DOE Headquarters line management leadership is essential to optimize the balance between safety, cost, and schedule in the safety basis arena.**
   - EM Site Offices are appropriately focused on addressing their own needs and issues and are not positioned to integrate and drive complex-wide change.
   - EM contractors have potential legal and business barriers and insufficient incentive to drive DOE complex-wide change. They also tend to be focused on their own sites.

- DOE oversight and support organizations are not chartered to, well-positioned for, or necessarily interested in advancing the interests of DOE line organizations.

- To successfully effect change, the DOE Headquarters line management representative(s) must be technically competent, have operational field experience, be persistent and biased to action, and have regular contact and entrée with senior EM decision-makers.

2. The safety control methodology in 10 CFR 830, Subpart B, while appropriate for some facilities, does not integrate well with other, equally valid methods.

- Title 10 CFR 830, Subpart B, is based on the derivation of controls from consequence analysis (i.e., start with a bounding amount of hazardous material, disperse it via a bounding accident scenario, calculate the resulting public and worker doses, and then identify the controls to keep the doses within acceptable levels).

- As shown in Figure 1, the Rule's approach is inconsistent with how certain other types of hazards and activities are typically controlled. This results in regulatory friction and inefficiencies. For example, hazardous work controls under the Occupational Safety and Health Administration's (OSHA) 29 CFR 1910.120 (also known as HAZWOPER) are largely expert-based and are not subject to the level of regulatory review and approval prescribed by 10 CFR 830, Subpart B.

- NRC employs a variety of regulatory approaches to deal with different types of hazards and activities more effectively. DOE has chosen instead to cover all of its nuclear activities under one Rule. This approach is at best inefficient, and in some cases, it may actually detract from safety (e.g., excessive review and approval requirements for certain types of hazards will be creatively avoided or not complied with, and/or they may consume limited resources that could be better applied to hazards of greater concern).

3. DOE has not yet tailored the application of 10 CFR 830, Subpart B, to efficiently address other overlapping regulations.

- Title 10 CFR 830, Subpart B, like other federal environmental and occupational safety regulations (e.g., Resource Conservation and Recovery Act [RCRA]) assumes that it alone is depended upon for safety.

- When these regulatory domains overlap, as is often the case for EM environmental restoration and waste management work, regulator resistance and/or failure to integrate these controls can result in duplicative inefficiencies.

Figure 1. Examples of "Commercial Practice" in the U.S. Nuclear Industry

Regulation	Industry Covered	Control Basis & Approval Authority
		Consequence-Based Controls
10 CFR 830, Subpart B	DOE	Hazard/accident analysis-derived safety systems and controls; DOE approved (DOE is both owner and regulator)
10 CFR 50	Commercial Power Reactors	Sophisticated hazard/accident analysis-derived controls; Regulator approved
10 CFR 70	Fuel Cycle Facilities	Subpart H, issued September 2000, moves towards the DOE model
		Generic Prescribed Controls
10 CFR 30 (Byproduct Material)	Radiographers, Medical Uses, Manufacturers	Regulator-defined systems and controls with little flexibility; Regulator-approved license. (NUREG-1556, 20 Volume Set)
		Expert-based Controls
10 CFR 33 (Broad Scope Licenses)	Multipurpose Labs	Regulator-defined expertise/process; User-defined and approved systems and controls
29 CFR 1910.120 (HAZWOPER)	Hazardous Waste Work (non-nuclear)	Regulator-defined expertise, process, and programs; User-defined and approved systems and controls
		Deterministic Performance-Based Controls
10 CFR 71	Off-Site Shipping and Transportation	Regulator-defined performance-based design requirements; Regulator-approved design and controls
		No User Controls
Certain sections of 10 CFR 30, 40 and 70 (i.e., exemptions)	Users of Consumer Products	Little to none. Based on regulator assessment of public risk. (Draft NUREG-1717, "Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials")

- The natural tendency of regulators is to insist that theirs is the "right way" to address any issue and that the other regulators should yield. The idea of defining a hierarchy of overlapping regulator roles and responsibilities was the subject of DNFSB/TECH-12, *Regulation and Oversight of Decommissioning Activities at Department of Energy Defense Nuclear Facilities*, dated August 1996, which is available on line at www.dnfsb.gov.

- Whereas environmental and occupational regulations are outside DOE's ability to control and interpret, 10 CFR 830, Subpart B, is not. DOE has already established the precedent of crediting other controls in its treatment of certified shipping containers and sealed radioactive sources in DOE-STD-1027-92.

- Due to an incomplete understanding of these other regulatory domains and a long history of inconsistent implementation of safety requirements within DOE, personnel charged with interpreting the DOE standards supporting 10 CFR 830, Subpart B, are understandably suspicious of attempts to credit controls that are not explicitly prescribed in a Subpart B-driven safety basis. As a result, controls that are driven by environmental regulations cannot be credited unless explicitly reiterated and redundantly controlled in a Subpart B safety basis.

- DOE line organizations must be the drivers behind identifying these inefficiencies and making the technical case for tailoring regulatory approaches.

- A more exhaustive discussion of the problems created by overlapping, unintegrated regulations can be found in Section 3.3 of DNFSB/TECH-16, *Integrated Safety Management*, dated June 1997.

4. **The lack of reliable and trusted estimates for the true cost of safety basis development and implementation is a debilitating limitation for sound cost-benefit decisionmaking.**

   - Collection of safety basis development and implementation cost data is not routinely and consistently done across the EM complex. As a result, decision-makers find it difficult to identify and assess these costs.

   - Due to some exaggerated claims about the cost of safety basis development and implementation in the past, qualitative and/or experience-based, cost-benefit arguments in support of tailoring requirements may be viscerally dismissed as unfounded by critics unless they are accompanied by substantive financial analysis. In addition, attempts to introduce cost-benefit ideas into the discussion are viewed with hostility by some as ignoble efforts to undermine or bypass safety.

   - The negative safety implications of expending limited resources on low-value tasks are also not well quantified. Again, regulators without on-site control, feedback, and/or knowledge as to how the "savings" will be redirected are highly suspicious of efforts to tailor or better define ambiguities in their regulations.

5. **There are substantial benefits to temporarily assigning a DNFSB technical staff member to a DOE line organization.**

   - The DNFSB staff gained valuable insights into the inner workings and considerations faced by DOE line managers. This enhances the DNFSB staff's ability to prioritize its efforts and recognize how better to effect change.

   - The DNFSB staff, by merit of its function, acquires insights across the DOE complex, not just within one office of DOE. The DOE line organization benefits from these broad insights, as well as from the specific work performed.

   - Having "one foot in both camps" can afford significant bureaucratic relief.

   - This arrangement should be equally as effective going the other direction. Senior DOE personnel serving temporarily on the DNFSB staff would gain much better insights as to the nature and basis for the DNFSB's concerns.

6. **Better defining the "graded approach" is only meaningful in technically specific circumstances.**

   - Numerous DOE Orders and standards use the term "graded approach" to reflect the ability within the Order or standard to tailor the level of rigor or control to the associated hazard or risk. This is deliberately done to afford DOE and its contractors flexibility. However, if this flexibility is not actively managed, it can result in significant inconsistency from site to site.

   - In the safety basis arena, significant grading is already achieved through a variety of methods:

     (a) Facility hazard categorization in accordance with DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, is used to grade the application of 10 CFR 830, Subpart B, and DOE-STD-3009-94.

     (b) DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Safety Analysis Reports*, makes an admirable effort to define the amount of grading permissible in each chapter of a DOE safety analysis report.

     (c) By definition, safety basis documents are already subject to significant grading as defined by the risks they attempt to control (e.g., a safety analysis allows for not prescribing criticality controls on non-fissile material).

     (d) Other mechanisms, such as the DOE exemption process in 10 CFR 820, provide additional means to grade safety basis requirements and documents.

- As discussed above in Major Conclusions 2 and 3 on tailoring of 10 CFR 830, Subpart B, there remains a wide variety of specific circumstances that merit explicit, complex-wide treatment as to what level of grading can and should be applied. One such instance is this study's attempt to address EM inactive waste sites. Others include the efforts to address transportation and facility disposition safety bases. The list in Appendix I contains several ideas for specific grading initiatives.

- At the beginning of this study, some expressed the hope that this study would provide greater clarity to the term "graded approach" as it applied to safety bases. The author found a generic definition elusive and that discussions and efforts on the graded approach were only meaningful when tied to specific technical circumstances.

6.0 RECOMMENDED PATH FORWARD

The author believes that significant progress and momentum has been achieved as a result of this study. To capitalize on EM's investment in this study, the author offers the following recommendations for EM's consideration:

1. **EM Headquarters should expeditiously create and fill a permanent, senior technical advisor position for safety basis.** This position and the person filling it should have the qualities described in Section 5, Major Conclusions, item 1. (The author is not available to fill this position.)

2. **Follow through on each of the study's specific initiatives as described in Section 4, Results of Study.** All of these efforts merit completion and are in a well-developed or near-final state, with identified responsible parties for seeing each item through to completion.

3. **Evaluate each of the items listed in Appendix I for relative priority and possible assignment to a responsible party for action.** In particular, the two items on transportation and facility disposition (Potential Ideas P02 and P03, respectively) merit additional near-term EM emphasis. The person identified in Recommendation 1 above should coordinate and have the authority to direct these efforts.

4. **Maintain a frank and open dialogue with EH (and the DNFSB) to address other safety control methods and tailoring to credit other regulations (see Section 5, Major Conclusions, items 2 and 3).** The person identified in Recommendation 1 above should lead this effort for EM. DOE line organizations must accept responsibility for identifying opportunities and driving change in these areas; this will not fix itself.

5. **Working within the EM contractor community, validate the extent and impact of not having reliable and trusted cost data (see Section 5, Major Conclusions, item 4).** This effort will require not only safety basis expertise but cost estimating and project management expertise as well. The results of such an effort would be expected to precipitate the need for an action plan to address opportunities for improvement.

6. **Retain the documents and records compiled during this study for reference and use, especially by the person identified in Recommendation 1.** Many of the references collected are no longer readily accessible via the internet due to homeland security concerns. Collecting this library of references, while seemingly trivial, accounted for a substantial amount of the author's time.

7. **EM should jointly evaluate with the DNFSB whether the concept of temporarily detailing technical staff to the other's organization is worth repeating.** Section 5, Major Conclusions, item 5 presents the author's opinion as to the relative merits of this action.

Appendix A – Tabulation of EM Site Information on Rule Compliance and Cost as of March 2002

Appendix A
Tabulation of EM Site Information on Rule Compliance and Cost as of March 2002

	Savannah River Site	Richland	Office of River Protection	Idaho	Oak Ridge	Rocky Flats	Others
Number of Documented Safety Analyses (DSAs)	18 (16 HC2 and 2 HC3)	29 (19 HC2 and 10 HC3)	3 (1 HC2, 1 HC3, and 1 HC?)	21 (20 HC2 and 1 HC3)	28 (13 HC2 and 15 HC3)	16 (12 HC2 and 4 HC3)	21 (10 HC2, 5 HC3, and 6 HC?)
Number of Generic DSAs	1	---	---	1	---	1	1
Number of Transportation DSAs (not included above)	---	1	---	1	---	1 (HC2)	---
Number of Compliant DSAs	9 (8 approved + 1 in approval)	7 (4 approved + 3 in approval)	0	12 (5 approved + 7 in approval)	0	10 (6 approved + 4 in approval)	6 approved
Percentage of Compliant DSAs	50%	24%	0%	57%	0%	62%	29%
Number of DSAs to be Brought into Compliance	9	22	3	9	28	6	15
Exemptions (in progress or planned)	None	PFP approved 4/2002; others possible (e.g., WESF)	None	None	Relief from annual updates for 6 BJC facilities	None	?
Number of Facilities Clustered in the DSAs or Having Individual Safety Documents (e.g., Auditable Safety Analysis):							
Hazard Category (HC) 2	124	27	177 HLW tanks and related waste transfer systems	104 HC2 and HC3 combined	48	12	?
Hazard Category 3	39	36	Not Counted	See Above	70	~8	?
Radiological	31	41	Not Counted	22	258, but <u>not</u> included in HC2 or HC3 DSAs	~12	?

	Savannah River Site	Richland	Office of River Protection	Idaho	Oak Ridge	Rocky Flats	Others
Estimated Costs of Safety Basis-Related Work:							
Average Cost to **Generate** a Safety Basis	$230,000 (from $100K for Saltstone to $1M for HLW)	$600,000 (not clear if this also includes implementation)	Not Evaluated	$266,000 actual (expected to be reduced up to 20% by stream-lining efforts)	$230,000 estimated	$600,000 estimated (includes implementation)	?
Estimated Cost to **Implement** a Safety Basis	$25K for Saltstone to $5M for HLW	See Above	Not Evaluated	Not Evaluated	Not Evaluated	See Above	?

The Basics:

Total EM Safety Bases	136
Compliant Safety Bases	44 (32%)
Noncompliant Safety Bases	92 (68%)
Assumed Cost to Generate One Safety Basis	$250,000
Total Estimated Cost for Safety Basis Generation	$23 million

Safety basis implementation requires additional funds.

Appendix B – Paul F. Gubanc Training and Qualifications

Appendix B
Paul F. Gubanc - Training and Qualifications

Formal Education

- **Master of Science, Nuclear Engineering (equivalent)** - BETTIS ATOMIC POWER LABORATORY, DOE, West Mifflin, PA
- **Master of Science, Chemical Engineering Practice** - MASSACHUSETTS INSTITUTE OF TECHNOLOGY (included graduate-level research at DOE's Oak Ridge National Laboratory and at General Electric's Watervliet, NY [silicones], and Selkirk, NY [engineered plastics] facilities), Cambridge, MA
- **Bachelor of Science, Chemical Engineering** - MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA

Work Experience

June 1998 - January 2002, Oak Ridge Site Representative, DNFSB, Oak Ridge, TN

June 1994 - May 1998, Hanford Site Representative, DNFSB, Richland, WA

July 1991 - May 1994, Senior Program Manager for Savannah River Site (SRS) (during Replacement Tritium Facility startup) and Hanford Site, DNFSB, Washington, DC

May 1990 - July 1991, DOE-EM general support services contractor, H&R TECHNICAL ASSOCIATES (WESTON OFFICE OF TECHNICAL SERVICES), Germantown, MD

November 1987 - April 1990, Prototype Reactor Plant Project Group Leader, U.S. NAVAL NUCLEAR PROPULSION PROGRAM (A JOINT DEPARTMENT OF DEFENSE/DOE OFFICE), Arlington, VA

January 1982 - November 1987, Nuclear & Project Engineer, U.S. NAVAL NUCLEAR PROPULSION PROGRAM (A JOINT DEPARTMENT OF DEFENSE/DOE OFFICE), Arlington, VA

Spring 1981 - December 1981, Chemical Process Engineer, BADGER AMERICA, INC., Cambridge, MA

Professional Credentials and Qualifications

- Registered Professional Engineer in the Commonwealth of Virginia
- DOE Radiological Worker II - maintained current since 1992
- OSHA 29 CFR 1910.120 Hazardous Material Worker (40-hour) - maintained current since 1991
- Member: American Institute of Chemical Engineers
- Member: American Nuclear Society

Appendix C – EM-1 Memorandum Establishing the Study Charter

Appendix C
EM-1 Memorandum Establishing the Study Charter

Department of Energy
Washington, DC 20585

January 15, 2002

MEMORANDUM FOR DISTRIBUTION

FROM: JESSIE HILL ROBERSON
ASSISTANT SECRETARY FOR
ENVIRONMENTAL MANAGEMENT (EM)

SUBJECT: REVIEW OF THE APPLICATION OF 10CFR830, SUBPART B, NUCLEAR SAFETY RULE

It appears the application of the 10CFR830, SUBPART B, Nuclear Safety Rule has not been adequately evaluated and the commitment for EM facilities is in jeopardy. There is a lack of an accepted interpretation of the 10CFR830, that allows appropriate application of tasks/standards to achieve closure without jeopardizing the health and safety, of the public, workers, or the environment. DOE's issuance of the 10CFR830 has essentially adopted a paradigm of safety regulation patterned after that used by the Nuclear Regulatory Commission (NRC) for licensing nuclear power reactors. Furthermore, whereas the NRC has unique and well defined Rules for each class of hazard licensed by the agency, DOE has elected to use one Rule to cover a widely diverse set of nuclear and radiological hazards and facilities. This has resulted in a situation where each DOE contractor has to develop a tailored or graded approach for each situation, which in turn requires review, modification, and concurrence by the DOE field office. Similar situations at different sites have the potential to have inconsistent solutions, costs and schedules. This may result in excessive Department expense and delay in closure.

I am initiating an effort which; 1) defines several different 10CFR830 compliance models, 2) lists candidate EM facilities for each of these models, 3) estimates cost and schedule savings, and 4) identifies the specific DOE-EM actions necessary to implement each model.

I have asked Paul Gubanc to develop, organize and complete this effort. He will be drawing heavily upon the experience of field personnel to complete this review over the next few months. I would like you to give him your full support and involvement to accomplish this very important assignment. Initially, I have asked him to focus on the Oak Ridge, Savannah River, Richland, and Office of River Protection facilities.

Any questions should be directed to Paul Golan at (202) 586-7709.

Jessie Hill Roberson
Assistant Secretary for
Environmental Management

Distribution:

Jim Owendoff, EM-2
Bev Cook, EM-3
Paul Golan, EM-5
Sandra Johnson, EM-1
Steve Cary, EH-1
Mark Frei, Acting Manager, Idaho Operations Office
Dr. Susan Brechbill, Manager, Ohio Field Office
Keith Klein, Manager, Richland Operations Office
Dr. Harry Boston, Manager, Office of River Protection
Barbara Mazurowski, Manager, Rocky Flats Field Office
Greg Rudy, Manager, Savannah River Operations Office
Dr. Inez Triay, Manager, Carlsbad Field Office
G. Leah Dever, Manager, Oak Ridge Operations Office

Appendix D – Study Schedule

Appendix D
Study Schedule

Week of	Location	Activity
January 28	DOE Headquarters	Kick-off with senior DOE field and contractor managers. Refine Headquarters' expectations and identify ongoing pilots.
February 4		Arrange and prepare for NRC discussions. Develop information/support request for field offices.
February 11	NRC Headquarters	Discuss NRC regulatory models.
February 18		Prepare for field office discussions.
February 25	SRS	Identify current plans, cost projections, and policy and guidance difficulties with 10 CFR 830 implementation. Identify the extent of the pilots deployed at the contractor level.
March 4	Hanford (both Richland and Office of River Protection), INEEL (at Salt Lake City, UT)	Same as above.
March 11	Oak Ridge	Same as above.
March 18	Rocky Flats, NRC Region 1	Examine models/tools employed at Rocky Flats Environmental Technology Site (RFETS) and discuss NRC's experience with 10 CFR 30 and decommissioning.
March 25		Evaluate and prioritize all proposed implementation models, tools, and concepts. Develop recommendations.
April 1	DOE Headquarters	Briefings to EH and the DNFSB on the proposed path forward. Briefing and release to EM-1 on the proposed path forward.
April 8		Preparation for workshops.
April 15	DOE Headquarters	EM 10 CFR 830 guidance memorandum workshops.
April 22	Rocky Flats	Model/tool development workshops.
April 29	DOE Headquarters	Briefings to EM-1 and the DNFSB on the workshop results.
May 6		Preparing, reviewing, and editing the final report.
May 13		Same as above.
May 20	DOE Headquarters	May 23 presentation of the final report to EM-1.
May 27	DOE Headquarters	May 30 presentation to the EFCOG Executive Council.

Appendix E – Study Reading List

Appendix E
Study Reading List

Document Number and Date	Document Title (web sites for convenience, not all inclusive)
DOE Regulations & Implementation Guides	www.tis.eh.doe.gov/enforce/rands/rands.html-ssi
10 CFR 820, Subpart E	*Procedural Rules for DOE Nuclear Activities – Exemption Relief*
DOE-STD-1082-94 (October 1994, EH)	*Preparation, Review, and Approval of Implementation Plans for Nuclear Safety Requirements* (39 pages)
DOE-STD-1083-95 (February 1995, EH)	*Requesting and Granting Exemptions to Nuclear Safety Rules* (17 pages)
10 CFR 830, Subpart B (January 2001, EH)	*Nuclear Safety Management – Safety Basis Requirements*
DOE G 421.1-2 (Guide, October 24, 2001, EH)	*Implementation Guide For Use in Developing Documented Safety Analyses to Meet Subpart B Of 10 CFR 830*
DOE G 423.1-1 (Guide, October 24, 2001, EH)	*Implementation Guide For Use In Developing Technical Safety Requirements*
DOE G 424.1-1 (Guide, October 24, 2001, EH)	*Implementation Guide For Use In Addressing Unreviewed Safety Question Requirements*
EH-53 Technical Interpretive Guides (20 total, 2-5 pages each)	As of May 10, 2002, located at http://tis.eh.doe.gov/nsps/interpretations.html
DOE Directives	http://www.directives.doe.gov/
DOE M 411.1-1B (Manual)	*Safety Management Functions, Responsibilities, and Authorities Manual (FRAM)*
DOE O 420.1 Change 3 (Order, November 22, 2000, EH)	*Facility Safety*
DOE O 430.1A (Order, October 14, 1998, FM)	*Life Cycle Asset Management*
DOE G 430.1-2 (Guide, September 29, 1999, FM)	*Implementation Guide for Surveillance and Maintenance during Facility Transition and Disposition*

Document Number and Date	Document Title (web sites for convenience, not all inclusive)
DOE G 430.1-3 (Guide, September 29, 1999, FM)	*Deactivation Implementation Guide*
DOE G 430.1-4 (Guide, September 2, 1999, FM)	*Decommissioning Implementation Guide*
DOE G 430.1-5 (Guide, April 24, 2001, EM)	*Transition Implementation Guide*
DOE O 435.1, Change 1 (Order, August 28, 2001, EM)	*Radioactive Waste Management*
DOE M 435.1-1, Change 1 (Manual, June 19, 2001, EM)	*Radioactive Waste Management Manual*
DOE O 440.1A (Order, March 27, 1998, EH)	*Worker Protection Management for DOE Federal and Contractor Employees*
DOE P 450.1 (Policy, June 15, 1995, EH)	*Environment, Safety, and Health Policy for the Department of Energy Complex*
DOE P 450.2A (Policy, May 15, 1996, GC)	*Identifying, Implementing and Complying with ES&H Requirements*
DOE P 450.3 (Policy, January 25, 1996, EH)	*Authorizing Use of the Necessary and Sufficient Process for Standards-Based ES&H*
DOE P 450.4 (Policy, October 15, 1996, EH)	*Safety Management System Policy*
DOE G 450.4-1B Volume 1 (Guide, March 1, 2001, EH)	*Integrated Safety Management System Guide* (Volume 1)
DOE G 450.4-1B Volume 2 (Guide, March 1, 2001, EH)	*Integrated Safety Management System Guide* (Volume 2)
DOE P 450.5 (Policy, June 26, 1997, DP)	*Line Environment, Safety and Health Oversight*
DOE P 450.6 (Policy, April 14, 1998, SE)	*Secretarial, Policy Statement on Environment, Safety and Health*
DOE O 460.1A (Order, October 2, 1996, EM)	*Packaging and Transportation Safety*

Document Number and Date	Document Title (web sites for convenience, not all inclusive)
DOE O 5481.1B Change 1 (Archived, September 23, 1986, EH-10)	*Safety Analysis and Review System* (covers Auditable Safety Analysis [ASA]; see also DOE-EM-STD-5502-94)
DOE Standards	http://tis.eh.doe.gov/techstds/
DOE-STD-1027-92, Change 1 (September 1997)	*Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports* (49 pages)
DOE-STD-1104-96 (February 1996)	*Review and Approval of Nonreactor Nuclear Facility Safety Analysis Reports* (32 pages)
DOE-STD-1120-98 (May 1998)	*Integration of Environment, Safety, and Health into Facility Disposition Activities, Volume 1 of 2* (55 pages)
DOE-STD-1120-98 (May 1998)	*Integration of Environment, Safety, and Health into Facility Disposition Activities, Volume 2 of 2* (128 pages)
DOE-STD-3009-94, Change Notice 1 (January 2000)	*Preparation Guide for U.S. DOE Nonreactor Nuclear Facility Safety Analysis Reports* (165 pages)
DOE-HDBK-3010-94, Change Notice 1 (March 2000)	*DOE Handbook, Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities,* "Volume I – Analysis of Experimental Data" (359 pages) "Volume II – Appendices" (253 pages)
DOE-STD-3011-94 (November 1994)	*Guidance for Preparation of DOE 5480.22 (TSR) and DOE 5480.23 (SAR) Implementation Plans* (55 pages)
Draft, DOE-STD-3011-94, Change Notice 1 (February 6, 2002)	"Guidance for Preparation of Basis for Interim Operation (BIO) Documents"
DOE-EM-STD-5502-94 (Canceled effective October 2001 due to fiscal year 2001 Sunset Review)	*Hazard Baseline Documentation* (31 pages) (section 5.2 defines ASA)
DOE-EM-STD-5503-94 (Canceled effective October 2001 due to fiscal year 2001 Sunset Review)	*EM Health and Safety Plan (HASP) Guidelines* (209 pages)

Document Number and Date	Document Title (web sites for convenience, not all inclusive)
Draft standard DOE-EM-STD-50XX-96, Revision 3 (SAFT-0029; May 20, 1996)	"EM Facility Hazard Characterization Standard" (never issued, supports alternate ARFs)
Draft DOE Handbook (SAFT-0085, April 2002, EH-52)	"Integration of Multiple Hazard Analysis Requirements and Activities"
DNFSB Documents	http://www.dnfsb.gov/
Recommendation 2000-2	*Configuration Management, Vital Safety Systems*
TECH-12 (August 19, 1996)	*Regulation and Oversight of Decommissioning Activities at Department of Energy Defense Nuclear Facilities*
RFETS Memorandum of Understanding between DOE, Environmental Protection Agency, State of Colorado, and DNFSB (February 15, 1996)	*Memorandum of Understanding Governing Regulation and Oversight of Department of Energy Activities in the Rocky Flats Environmental Technology Site Industrial Area*
TECH-16 (June 1997)	*Integrated Safety Management*
TECH-19 (April 1998)	*Authorization Agreements for Defense Nuclear Facilities and Activities*
TECH-20 (February 1999)	*Protection of Collocated Workers at the DOE's Defense Nuclear Facilities and Sites*
TECH-28 (November 7, 2000)	*Safety Basis Expectations for Existing DOE Defense Nuclear Facilities and Activities*
NRC Regulations, Guidance, & Publications	www.nrc.gov/reading-rm/doc-collections/cfr/ (CFRs only)
SECY-99-100 (March 31, 1999)	*Framework for Risk-informed Regulation in the Office of Nuclear Material Safety and Safeguards* (33 pages)
NUREG-1539 (April 1996)	*Methodology and Findings of the NRC's Materials Licensing Process Redesign* (a critical self-examination of materials licensing issues spurred primarily by cost recovery)
NUREG-1708	*External Regulation of DOE Nuclear Facil*ities

Document Number and Date	Document Title (web sites for convenience, not all inclusive)
10 CFR 20, Subpart E	*Radiological Criteria for License Termination*
10 CFR 30	*Rules of General Applicability to Domestic Licensing of Byproduct Material*
NUREG-1556, Volumes 1-20	*Consolidated Guidance About Materials Licenses* (20 Volumes initially issued over period May 1997 to December 2000, serves as NRC's Standard Review Plan)
NUREG-1717, Draft Report for Comment (December 1999)	"Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials" (804 pages)
NUREG/CR-6642 (December 1999)	*Risk Analysis and Evaluation of Regulatory Options for Nuclear Byproduct Material Systems* (1,000+ pages)
10 CFR 31	*General Domestic Licenses for Byproduct Material*
10 CFR 32	*Specific Domestic Licenses to Manufacture or Transfer Certain Items Containing Byproduct Material*
10 CFR 33	*Specific Domestic Licenses of Broad Scope for Byproduct Material* (e.g., laboratories)
10 CFR 40	*Domestic Licensing of Source Material*
NUREG-1569, Revision 1, Draft Report for Comment (January 2002)	"Standard Review Plan for In Situ Leach Uranium Extraction License Applications"
NUREG-1620, Revision 1, Draft Report for Comment (January 2002)	"Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act"
10 CFR 50 (especially 50.34 for Preliminary Safety Analysis Reports (SAR) and Final SARs, 50.36 for Technical Safety Requirements (TSR), 50.47 emergency plans, 50.48 fire protection)	*Domestic Licensing of Production and Utilization Facilities* (i.e., production reactors, fuel reprocessing plants and power reactors)
10 CFR 51	*Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions* (primarily National Environmental Policy Act compliance)

Document Number and Date	**Document Title (web sites for convenience, not all inclusive)**
10 CFR 61	*Licensing Requirements for Land Disposal of Radioactive Waste*
10 CFR 63	*Disposal of High-Level Radioactive Wastes In a Geologic Repository at Yucca Mountain, Nevada*
10 CFR 70 (especially Subpart H)	*Domestic Licensing of Special Nuclear Material*
NUREG-1198 (June 1986)	*Release of UF_6 From A Ruptured 48Y Cylinder at Sequoyah Fuels Corporation Facility: Lessons-Learned Report* (one fatality, January 1986)
NUREG-1450 May 29, 1991	*Potential Criticality Accident at the General Electric Nuclear Fuel and Component Manufacturing Facility*
NUREG-1520 (especially Chapter 3 on Integrated Safety Analysis, January 2002)	*Standard Review Plan for the Review of License Applications for a Fuel Cycle Facility* (219 pages)
10 CFR 71	*Packaging and Transportation of Radioactive Material*
10 CFR 72	*Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste*
NRC "Timeliness Rule," Federal Register, Final Rulemaking, July 15, 1994	*Timeliness in Decommissioning of Materials Facilities* (10 CFR Parts 2, 30, 40, 70, and 72)
NUREG-1727	*NMSS Decommissioning Standard Review Plan*
Draft NUREG-1757, Volume 1 (of 3 planned) (January 2002)	"Consolidated NMSS Decommissioning Guidance" issued for public comment (433 pages)
Other	http://www.access.gpo.gov/nara/cfr/index.html
29 CFR 1910.120 (1910 covers safety and health for General Industry) and 29 CFR 1926.65 (1926 covers safety and health for Construction)	*OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER)*
February 4, 2002	*A Review of the Environmental Management Program* (DOE Top-to-Bottom EM Review)

Appendix F – Agenda for Site Visits in Support of the EM 10 CFR 830, Subpart B, Study

Appendix F
Agenda for Site Visits in Support of the EM 10 CFR 830, Subpart B, Study

Dates: SRS, February 25, 1pm – March 1, 2002, Noon
Hanford, March 4, 8am – March 7, 2002, 3:30pm
Idaho National Engineering and Environmental Laboratory (INEEL) at Salt Lake City – March 8, 2002, 8am-3pm
Oak Ridge, March 11, 1pm – March 15, 2002, Noon
Rocky Flats, March 18, 8am – March 19, 5pm

Attendees: Paul Gubanc, DNFSB on detail to EM
Dr. Maria Gavrilas-Guinn, EM-5 (as available and as an observer only)

Location: As listed above

Background & Purpose

Mr. Gubanc has been detailed for 120 days to the DOE EM-1 to conduct a study on 10 CFR 830, Subpart B (i.e., the "SAR Rule"), implementation at EM nuclear facilities. The goal of this study is to identify opportunities for EM to comply with 10 CFR 830 in a manner that minimizes cost and adds real safety value. This study is expected to:

1. Identify several different 10 CFR 830 compliance models and tools,
2. List candidate EM facilities for each of these models and tools,
3. Estimate cost and schedule savings for employing these models (which may serve as a basis for DOE prioritization), and
4. Identify the specific EM actions necessary to implement each recommended model and tool.

Assumptions & Guidelines for the Study/Agenda

1. The study is focused on EM Hazard Category 2 and 3 nuclear facilities.

2. The study is intended to identify potential models and tools for 10 CFR 830, Subpart B, compliance with wide applicability and a high probability of success. The study schedule and the April 2003 deadline do not make revisions to 10 CFR 830 and its guides very attractive as areas to invest much energy.

3. The above-mentioned models and tools need to be sufficiently developed by the end of March 2002 to support the study's schedule. Concepts and concerns not sufficiently developed for near-term use may be identified as opportunities for future study.

4. Protracted discussion of highly unique or truly high-hazard facilities will probably not be fruitful unless there are some specific elements of the safety analysis approach that have wide applicability.

5. Just like the television commercial, Mr. Gubanc is an "An Army of One." This study is not staffed to independently develop models and tools.

6. I, Paul Gubanc, am not a well-practiced expert in all things related to 10 CFR 830 and am fallible. Suggestions and corrections are gladly and willingly accepted.

7. This is not a DNFSB staff review and none of my discussion or communications should be viewed as endorsement or criticism by the DNFSB or its staff.

Administrative Notes & Considerations

1. These reviews are not intended to require extensive preparation of formal presentation material. Unless specifically requested, informal discussions are desired, although providing supporting documents will be appreciated.

2. Requests for and provision of documentation need not comply with DOE's interface manual with the DNFSB. All documents requested will remain in the custody of DOE and will not be delivered to the DNFSB library or its staff. Each site's DNFSB liaison office may be utilized, however, to facilitate site visit arrangements and shipment of requested documents.

3. The information to be discussed each day may be rearranged to facilitate the site's needs so long as all of the requested information is covered.

4. At Hanford, the Richland Operations Office and the Office of River Protection can choose to present either jointly or separately.

5. For INEEL and Rocky Flats, plan to discuss the Monday and Tuesday portions of the agenda only. The Monday portion should be abbreviated to approximately an hour or less.

6. All questions regarding this agenda or the nature of the 10 CFR 830, Subpart B, study should be referred to Mr. Gubanc at 865-574-6740 (telephone), 877-749-7503 (pager), electronic mail: gubancpf@oro.doe.gov.

Tentative Agenda

Monday

1300-1330 In-brief for senior management and review participants.

1330-1700 Describe/discuss the following:

- Overview of DOE field office and prime contractor organizations, including the identification of, and contact info for, key personnel associated with 10 CFR 830 implementation.
- For each prime contractor at the site, list and describe each of the Hazard Category 2 and 3 EM nuclear facilities. This information should clearly convey understanding of both the individual facilities involved and how these facilities are "bundled" into their respective safety basis documentation.

Discuss any plans or intent to "rebundle" the facilities into their respective safety bases.
- For each safety basis document, identify the date of its last revision, its perceived level of compliance with 10 CFR 830, and the effort (time, cost and man-months, if known) necessary to come into compliance with 10 CFR 830.

Tuesday

0800-1200 Using the list of items in Gubanc's *10 CFR 830 Models, Tools, Concepts, Concerns to Evaluate* (provided separately, MS Word file named PilotsList.doc), please be prepared to discuss the following:
- For each model or tool for which your site is identified as the creator or lead for, please discuss each item individually. Priority should be given to those models or tools most fully developed and ready for use elsewhere.
- Please be prepared to show and explain documents that constitute and/or utilized the model or tool being discussed.
- Please identify key assumptions and limitations of the model or tool being discussed that would limit its application at other sites or facilities.
- Please identify what level of technical review the model or tool has received from internal and independent peer reviewers, DOE technical subject matter experts, federal or state regulators, DNFSB staff (the identification of specific individuals who conducted these reviews and documentation of their findings would be appreciated). Identify any known implementation issues with any of the above groups.
- If additional development is necessary, please identify both the anticipated scope of work and schedule to complete it.

1200-1300 Lunch

1300-1700 Continuation of morning discussion.

Wednesday

0800-1200 Using the list of items in Gubanc's *10 CFR 830 Models, Tools, Concepts, Concerns to Evaluate* (provided separately, MS Word file named PilotsList.doc), please be prepared to discuss the following.
For each model or tool which another site is identified as the creator or lead for, please discuss:
- Your site's level of understanding of the model or tool. Please discuss any amplifying communications you have held with the sponsor site and the level of facilitation provided by that site, EM Headquarters, EH-53, EFCOG, DNFSB site visits, etc.
- Please identify any policy or implementation issues/concerns your site has with the key assumptions and limitations of the model or tool that would limit its application at your site or facilities.
- The extent to which your site has proceeded to import another site's model or tool.

- The amount of additional development necessary, if known, to fully implement this model or tool.

Lunch

1300-1700 Using the list of items in Gubanc's *10 CFR 830 Models, Tools, Concepts, Concerns to Evaluate* (provided separately, MS Word file named PilotsList.doc), please be prepared to discuss the following. For each concept or concern, please discuss:

- Your site's level of understanding of the concept or concern.
- For concepts or concerns, your site's direct or indirect knowledge of possible models or tools (and points of contact, if known) which addressed the concept or concern.
- For concerns, what organizations/individuals do you perceive are the key to resolving the above concern and what would you propose they do to address the concern.
- What priority your site places on further development of specific concepts or resolution of specific concerns.

Thursday

All Day Open for followup discussions.

Friday

800-1100 Closure of followup discussions. Solicitation of ideas from field on how best to conduct the second half of the 10 CFR 830 study to maximize effectiveness.

1100-1200 Exit brief for senior management, if desired.

Appendix G – Draft EM-1 Guidance on 10 CFR 830, Subpart B, Implementation

Appendix G
Draft EM-1 Guidance on 10 CFR 830, Subpart B, Implementation

MEMORANDUM FOR DISTRIBUTION

FROM: JESSIE HILL ROBERSON
ASSISTANT SECRETARY FOR
ENVIRONMENTAL MANAGEMENT

SUBJECT: Supplemental EM Guidance for Implementing 10 CFR 830 Subpart B

As part of the 10 CFR 830 Subpart B Implementation study currently underway within DOE-EM, three workshops were conducted at DOE Headquarters during the week of April 15, 2002. The focus of these workshops was to facilitate cost-effective and safety-enhancing implementation of the nuclear safety rule. Participants from both DOE and EM contractors were present from the following sites: Brookhaven National Laboratory, Hanford (both Richland and Office of River Protection), INEEL, LLNL, Mound, Oak Ridge, Rocky Flats, Savannah River, and the Waste Isolation Pilot Plant. DOE participants from various headquarters offices in Environmental Management (EM-5), Environment, Safety and Health (EH-10, EH-23 and EH-53) and General Counsel (GC-52) were also in attendance at various times. I very much appreciate each of your offices' help in making these workshops a success.

Based on the inputs of the workshop participants, supplemental 10 CFR 830 Subpart B guidance was prepared for my consideration in the areas of exemptions, nuclear facility hazard categorization, and safety basis implementation. This guidance is intended to eliminate uncertainty and clarify expectations which, in turn, will enhance safety and reduce costs. These three sets of guidance, which I fully endorse, are attached for your offices' and contractors' use. Some have cautioned that the retrievability, permanence and regulatory bases for this guidance would be better located in DOE guides and standards. While recognizing this as a preferable endpoint, my goal in issuing this guidance now is to allow for more timely, cost-effective and consistent application across the EM complex. Therefore, you are requested to expeditiously implement this guidance with your contractors and advise Sandra Johnson, EM-5, of the completion of your implementation actions within 30 days of the date of this memorandum. For questions or clarification, please contact Sandra Johnson, Director, EM-5, or have your staff contact Dr. Maria Gavrilas-Guinn, EM-5 staff.

Attachments:
1. EM Supplemental Guidance on 10 CFR 830 Exemptions (with attached diagram)
2. EM Supplemental Guidance on Nuclear Facility Hazard Categorization
3. EM Supplemental Guidance on DSA/TSR Implementation

DRAFT	DRAFT

Attachment 1 to draft EM-1 Memorandum

EM Supplemental Guidance on 10 CFR 830 Exemptions

As previously reiterated in EM memoranda of January 10, 2001, March 27, 2001, and April 8, 2002, exemptions to 10 CFR 830 will be processed consistent with 10 CFR 820 and DOE-STD-1083-95, *Requesting and Granting Exemptions to Nuclear Safety Rules,* February 1995. The following additional guidance supplements these existing requirements.

1.1 10 CFR 830.207(a) requires the contractors to submit a rule-compliant safety basis for DOE approval by April 10, 2003. Consistent with the precedent established in DOE Office of Enforcement Guidance Supplement 95-01, EM contractors should submit requests for exemption from 10 CFR 830.207(a) to DOE no later than February 10, 2003.

1.2 Implementation, as well as preparation and approval, of safety basis documents can be significant cost and schedule drivers. Exemption requests must address two types of implementation actions in their justification:

1.2.1 As discussed in DOE-STD-1083-95, Section 3.2(c), the scope, cost and schedule of actions necessary to implement a rule-compliant documented safety analysis (DSA) and associated technical safety requirements (TSRs) shall be addressed. Attachment 3 to this memorandum provides specific considerations for DSA/TSR implementation.

1.2.2 As discussed in DOE-STD-1083-95, Section 3.2(g), the scope, cost and schedule of actions necessary to implement the requested exemption and any related "mitigating actions" shall be specifically addressed.

1.3 The attached flow diagram illustrates the EM process I have established for the approval of exemption requests.

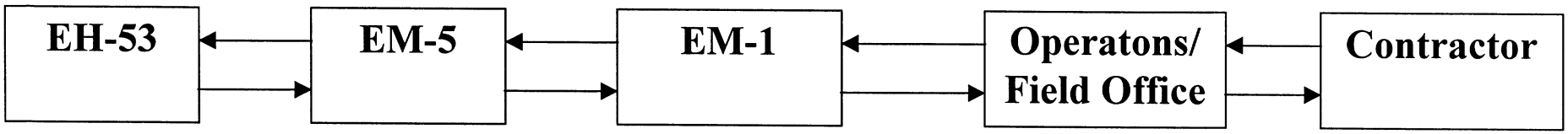
1.3.1 The EM-5 site liaisons (listed on the diagram) are the primary points of contact for early coordination and processing of 10 CFR 830 exemption requests.

1.3.2 In accordance with DOE-STD-1083-95, a period of 180 days is allowed for DOE review and disposition of exemption requests. The goal of EM-Headquarters is to complete the process in less than 60 days, contingent upon the contractor satisfying the content requirements specified in Section 3.2 of DOE-STD-1083-95.

1.4 ISMS Guide 450.4-1B, Volume 1, Chapter 2, specifies format and content requirements for authorization agreements. Consistent with this existing guidance, any approved exemptions to Subpart A or Subpart B to 10 CFR 830 shall be incorporated into the associated authorization agreements. For nuclear facilities without authorization agreements, documentation of approved exemptions shall be contractually captured and maintained. This will ensure each exemption, and the terms and conditions embodied within, has a contractual home and is not "lost" with the passage of time.

1.5 Following EM-1 approval of an exemption request, the contractor shall be required by the local DOE office to satisfy any conditions established in the approved exemption requests. This is expected to include commitment tracking of future actions required by the exemption.

10 CFR 830 EM Exemption Process



- Operations Office initiates early discussions with EM Site Liaison on exemption content, documentation, and timing.
- Operations Office sends the contractor's exemption request and DOE evaluation and recommendation to EM-1, with copies to EM-5 and EH-53.
- EM-5 Site Liaison verifies that the exemption request package is complete (contains elements required by 10 CFR 830 and DOE-STD-1083-95).
- EM-5 Site Liaison prepares the exemption approval package (memo, technical review and decision); as appropriate, consults with EM Site Office for programmatic impact.
- EM-5 obtains EH-53 comments and interfaces with GC as needed (Maria Gavrilas-Guinn).

EM-3

DAS

EM Site Office

EM-5 Site Liaisons

Carlsbad	Thomas T. Evans	301-903-7609
Idaho	John J. Serocki	301-903-7999
Nevada	Thomas T. Evans	301-903-7609
Oak Ridge	Teresa Gepner	301-903-2241
Oakland	Thomas T. Evans	301-903-7609
Ohio	Thomas T. Evans	301-903-7609
Rocky Flats	Terrance M. Tracy	301-903-2173
Richland	Terry Krietz	301-903-6456
ORP	Terry Krietz	301-903-6456
SRS	Craig C. Scott	301-903-2192

Attachment 2 to draft EM-1 Memorandum

EM Supplemental Guidance on Nuclear Facility Hazard Categorization

10 CFR 830.202(b)(3) requires nuclear facilities to be categorized in accordance with DOE-STD-1027-92, Change Notice 1. DOE-STD-1027-92 describes a simple threshold methodology for quick, preliminary categorization but acknowledges additional analysis may justify a different final hazard category. Based on insights and inquiries obtained from the EM field, the following clarifications and expectations are provided for use at EM facilities.

2.1 DOE-STD-1027-92, Section 3.1.2, permits for final hazard categorization to a lower or higher hazard category. For cost effectiveness, final hazard categorization may be developed and approved by DOE separate from, and prior to, completion of the associated documented safety analysis and related technical safety requirements.

2.2 For nuclear facilities with inventories above the category 3 threshold quantity in DOE-STD-1027-92, Table A.1, but for which the proposed final hazard categorization is less than Hazard Category 3:

2.2.1 DOE approval of the final hazard categorization is required in accordance with DOE M 411.1-1B, *Safety Management Functions, Responsibilities, and Authorities Manual*.

2.2.2 The contractor must maintain the assumptions and controls (e.g., inventory control) as defined in the approved final hazard categorization.

2.3 10 CFR 830.202(c)(1) requires that the safety basis be kept current to reflect changes in the facility, work, and hazards. EM contractors shall have a process to ensure that final hazard categorizations for below category 3 nuclear facilities are revisited for any changes that may affect the approved final hazard categorization controls or assumptions (e.g., introduction of a new energy source). Some sites utilize a process very similar to their unreviewed safety question (USQ) process for this purpose.

2.4 Section 9.3.2 of DOE M 411.1-1B assigns the responsibility to the cognizant secretarial officer (CSO) to approve the final hazard categorization. Pending clarification by EH or GC, it is EM's position that final facility hazard categorization, as approved by DOE, determines the applicability of 10 CFR 830, Subpart B. For facilities whose hazard categorization is not final or DOE approval of the final hazard categorization downgrade is pending, the contractor must comply with 10 CFR 830, Subpart B, in accordance with the preliminary hazard categorization or the current approved final hazard categorization.

2.5 Nuclear facilities which are recategorized as below category 3 are expected to realize cost savings since hazard category 2 and 3 nuclear facilities are the subject of higher expectations and certain DOE rules and orders (e.g., 10 CFR 830 Subpart B and DOE O 425.1B, *Startup and Restart of Nuclear Facilities*). DOE-STD-1027-92, Attachment 1, provides the category 3 dose threshold criterion but does not provide the method to calculate this dose. To support EM facility recategorization, EM will be requesting assistance from EH and/or the EM contractor community to develop a standard method for demonstrating facility recategorization below this dose threshold criterion.

Attachment 3 to draft EM-1 Memorandum

EM Supplemental Guidance on DSA/TSR Implementation

Implementation of the documented safety analysis (DSA) and technical safety requirements (TSR) is not explicitly addressed in 10 CFR 830. EM understands that there may be a need for such an implementation period following DSA/TSR approval. For the purpose of this guidance, DSA/TSR implementation is defined as those activities that occur between the issuance of the safety evaluation report (SER) and the effective date of the new DSA/TSR.

3.1 In accordance with 10 CFR 830.203, the USQ process applies to the existing safety basis (e.g., basis for interim operations, safety analysis reports) until that basis is supplanted by the new DSA/TSR on its effective date.

3.2 During development, review, approval, and prior to the effective date of the new DSA/TSR, configuration management shall be maintained on the new DSA/TSR. The purpose of this is to evaluate changes to the facility, the analysis, or both, to identify those that must be addressed in the new DSA/TSR prior to the effective date.

3.3 EM field offices shall ensure that contractors formally address DSA/TSR implementation cost, scope, and schedule in all future DSA/TSR submittals.

3.4 EM approval authorities shall specifically address the DSA/TSR effective date and any conditions of approval specific to implementation in the associated safety evaluation report (SER). Unless the effective date is specifically addressed in the SER, the DSA and TSR are effective immediately upon issuance of the SER per 10 CFR 830.207(b). (See also 66 FR 7, January 10, 2001, page 1816, Response to Comment LL.) "Conditions of approval" are briefly discussed in Section 3 of DOE-STD-1104-96, *Review and Approval of Nonreactor Nuclear Facility Safety Analysis Reports*.

3.5 Configuration management costs for new DSA/TSRs are directly related to the length of the implementation period. Therefore, DSA/TSR implementation should be of high priority and preferably accomplished within 90 days of SER issuance. The duration of the DOE review and approval process, likewise, drives these costs and should also be of high priority and preferably accomplished within 90 days.

3.6 On April 8, 2002, I requested that you provide additional schedule information on DSA/TSR implementation. Examples of activities that contribute to and should be accounted for in the implementation duration include: hardware modifications and testing, procedural development, personnel training, and verifying completion of implementation preparations.

Appendix H1 – Options Considered for Addressing EM Inactive Waste Sites

Appendix H1
Options Considered for Addressing EM Inactive Waste Sites

Issue

Title 10 CFR 830, *Nuclear Safety Management*, Subpart B, "Safety Basis Reauirements, prescribes safety basis requirements for Hazard Category 2 and 3 nuclear facilities. EM contractors manage over 5,000 inactive waste sites that are already subject to Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and/or RCRA, and other regulations that they and EM judge adequately address public, worker, and environmental safety. Applying the additional process and controls of 10 CFR 830, Subpart B, to these inactive waste sites will not substantially improve safety and will divert limited EM resources from the primary mission of hazard reduction.

Table 2. Potential Solutions

Potential Solution	Considerations
1. Prepare hazard categorization, DSAs, and TSRs for inactive waste sites (the "no action" alternative).	This action diverts limited resources for minimal safety benefit. There is potential for broadening DSAs to address subsurface releases.
2. Recategorize inactive waste sites as below Hazard Category 3 on a site-by-site basis, thus avoiding the Unreviewed Safety Question (USQ), DSA, and TSR requirements of Subpart B.	This action requires each contractor to develop its own justification. Due to the lack of a standard method for final categorization of less than Hazard Category 3, variability in DOE site approvals is probable.
3. EM-1 issues final categorization for all EM inactive waste sites as being below Hazard Category 3.	This is the most efficient approach. It is fully within EM-1's authority. EH or General Counsel concurrence is not required. It eliminates redundancy and variability at each EM site.
4. Permanent exemption for inactive waste sites from 10 CFR 830, Subpart B.	EH and General Counsel objections are possible. Per 10 CFR 820, each contractor is required to submit an exemption package.
5. EH-53 issues technical clarification that inactive waste sites are not subject to Subpart B.	EH-53 is not expected to support this action.
6. EH-53 concurs with CERCLA/RCRA as alternate methodology for DSAs, and EM issues limited exemptions to USQ and hazard categorization.	EH-53's support is probable for the alternative methodology but uncertain for limited exemptions. The timing could be of concern. (This is EH-53's preferred option.)
7. General Counsel processes a Rule interpretation or EH processes a Rule amendment that inactive waste sites are not subject to Subpart B.	General Counsel and EH support are uncertain. This action is not timely, and the outcome is uncertain.

Required Timing

Action is necessary to provide an inactive waste site solution in advance of the April 10, 2003, deadline by which Rule-compliant nuclear facility hazard categorizations, DSAs, and TSRs are required to be submitted for DOE approval.

Appendix H2 – Draft EM-1 Memorandum on Final Hazard Categorization for Inactive Waste Sites

Appendix H2
Draft EM-1 Memorandum on Final Hazard Categorization for Inactive Waste Sites

MEMORANDUM FOR DISTRIBUTION

FROM: JESSIE HILL ROBERSON
ASSISTANT SECRETARY FOR
ENVIRONMENTAL MANAGEMENT

SUBJECT: EM-1 Final Hazard Categorization of Inactive Waste Sites (IWSs)

[As of May 17, 2002, results for the inadvertent intruder scenario, discussed in Enclosure 3, suggest amendments to this argument or alternate approaches will be necessary. Enclosures 1, 3 and 4 also require additional work to finalize them. – P. Gubanc]

EM is responsible for a large number of DOE sites that include thousands of individual waste sites, many with no on-going intrusive activities. These inactive waste sites (as defined in Enclosure 1) exist primarily at the following sites: Fernald, Hanford-RL, INEEL, Nevada Test Site, Oak Ridge, and Savannah River. Other DOE sites which currently have, or will have as a result of decommissioning, inactive waste sites include: Hanford-Office of River Protection, Rocky Flats, and some of the DOE national laboratories. These inactive waste sites are subject to environmental regulation and oversight, primarily through DOE Site-specific federal facility compliance agreements. This regulation results in the imposition of controls for the protection of the public, workers and environment.

10 CFR 830.202(b)(3) requires nuclear facilities to be categorized in accordance with DOE-STD-1027-92, Change Notice 1. DOE-STD-1027-92 describes a simple threshold methodology for quick, preliminary categorization but Section 3.1.2 acknowledges additional analysis may justify a different final hazard category. Many of the above mentioned inactive waste sites could be preliminarily categorized as category 2 or 3 nuclear facilities. Based on the minimal public and worker safety risk presented by these inactive waste sites and other existing regulatory controls which preserve this level of minimal risk, EM believes final recategorization of its inactive waste sites is justified.

At an EM workshop near the Rocky Flats Site on April 23-25, 2002, EM DOE and contractor representatives from most of the EM sites presented arguments supporting a qualitative hazard analysis for inactive waste sites as reflected in Enclosures 1 through 4. As suggested by DOE-STD-1027-92, Figure 4.1, EM considers these inactive waste sites as "simple facilities" and thus hazards analysis in accordance with Section 4.1 is sufficient for final categorization. EM considers that the preclusion of external energy sources and the passive confinement of the

inactive waste site provides sufficient assurance that the category 3 dose criterion of DOE-STD-1027-92 will not be exceeded during any unmitigated release. EM further considers the application of existing regulations (see Enclosure 2) provides sufficient assurance that the bases for this conclusion will be preserved.

Therefore, in accordance with Section 9.3.2 of DOE M 411.1-1B, *Safety Management Functions, Responsibilities, and Authorities Manual*, which assigns the responsibility to approve the final hazard categorization to the cognizant secretarial officer (CSO), I designate all EM inactive waste sites as being below Category 3 nuclear facilities. To utilize this final categorization, you and your contractors must verify that they comply with the following conditions of approval:

1) They are applying this guidance only to inactive waste sites as defined in Enclosure 1;
2) These inactive waste sites are being regulated under RCRA and/or CERCLA; and
3) These inactive waste sites are subject to the controls identified in Enclosure 2.

For questions or clarification, please contact Sandra Johnson, EM-5.

4 Enclosures

Enclosure 1 to EM-1 Memo on Inactive Waste Site Categorization

Inactive Waste Site Definition

[Based on inquiries as of May 17, 2002, the coverage of inactive underground storage tanks (e.g., IMUSTs at Hanford) should be explicitly addressed here. – P. Gubanc]

For the purpose of this enclosure, "inactive waste sites" are sites covered with a soil or engineered barrier that contains the hazardous radioactive materials. These materials are contained in a general soil matrix as a result of liquid discharge or spill, legacy burial grounds, or areas that contain contaminated equipment, tanks, pipes, or other items disposed of at the waste site. Physical features preclude the introduction of an energy source that may disperse the radioactive material.

Intrinsic to this description are the passive and administrative features, described in Enclosure 2, that precludes intrusive activities, controls access, and provides barriers to the release of radioactive material to the above-ground environment. Once environmental remediation activities commence, or if other intrusive activities are introduced, the waste site no longer meets the description of an inactive waste site.

The following items are specifically not included in the definition of inactive waste sites:

1. Above ground structures or containers.
2. Below-grade facilities/structures with human access or active provision of services (e.g., ventilation, electricity, steam).
3. Any intrusive activity of the inactive waste site (e.g., waste sampling, acceptance or retrieval activities).
4. Above-ground remediation activities for an inactive waste site (e.g., pump and treat facilities adjacent to an inactive waste site).
5. Evaporation Ponds and sludges.

Enclosure 2 to EM-1 Memo on Inactive Waste Site Categorization

Inherent Physical Features and Controls Provided at Inactive Waste Sites

Inactive waste sites (IWS) are subject to physical features and controls that afford protection to workers, the public and environment. These protective measures are already in place for IWSs as mandated through various statutory and regulatory requirements. These include provisions as listed below.

Inherent Physical Features

The soil overburden physical characteristic of an IWS provides an inherent control from release of hazardous materials. The soil overburden either exists naturally or as an engineered barrier. Engineered barriers may consist of differing soil types (i.e. clay or sand), riprap, an asphalt or cement cap, or a combination of these features. Depending on the site, RCRA or CERCLA may indicate the need for an engineered barrier designed to protect against water or biota intrusion. These forms of cover provide the following protective measures for the public, workers, and environment.

- **Shielding.** Radiation dose reduction due to shielding. Soil overburden prevents most, if not all, significant exposure to nearby workers. Additionally, 10 CFR 835 provides a regulatory mechanism to ensure any needed additional level of protection is identified and appropriate measures taken.
- **Intrusion Barrier.** Protection from external energy sources. The wastes in the IWS are protected from impact by energy sources commonly considered for above ground structures. For example, facility fires, electrical, hot work, range fires, local flooding, impact due to common carriers (vehicles, trains, planes), or falling objects. To expel significant levels of waste, sources of energy would need to act below the soil overburden rather than merely impacting the soil cover. The soil overburden also provides a barrier against unintentional intrusive activities. These waste sites are clearly marked, such that intentional excavation is required to defeat the barrier. In addition, if an engineered barrier exists, this provides additional protection that requires extensive effort to penetrate.
- **Containment.** The soil cover provides a level of containment to prevent surface release. Normal dispersive mechanisms are not significant concerns. Wind transport is precluded and water runoff is precluded or reduced from affecting the hazardous radiological inventory.
- **Confinement**. If an accident condition is possible, the soil overburden provides a smothering effect on any dispersive events as well as filtration of gases and particulates.
- **Passive Barrier.** Soil overburden is passive. By definition, no external energy such as electrical, pneumatic, or hydraulic is required to maintain the barrier. Although this is a key feature, no worker actions are required for it to be fully effective. There is no mechanism to easily remove or distribute hazardous radiological inventory without intentional intrusive activities specifically designed to defeat the barrier. Potential migration of the waste inventory through environmental transport is addressed by RCRA/CERCLA.

Site Level Institutional Programs

Inactive waste sites are located on DOE property and are not readily accessible to the public. They are also subject to physical access controls as required by 29 CFR 1910.120 (HAZWOPER) and 10 CFR 835. These measures provide additional buffers against potential disturbances or unauthorized intrusive activities that are required to gain access to radiological or hazardous materials.

Work Control Process

Workers are precluded from conducting activities that may disturb an IWS through mechanisms provided by established work control systems. These include processes for work authorization and the development and implementation of hazard controls in accordance with integrated safety management system requirements (i.e., as required by 48 CFR 970.5223-1), as well as worker protection measures invoked by 29 CFR 1910.120 and 29 CFR 1926.65.

Radiation Protection Programs

Radiological controls are provided at inactive waste sites per 10 CFR 835. The pertinent controls include:

- Individual and area monitoring where necessary (Sections 835.402 and 835.403)
- Entry control for radiological areas (Subpart F)
- Posting and labeling requirements (Subpart G)
- Proper creation, maintenance, and final disposition of monitoring and administrative records (Subpart H)
- Training (Subpart J)
- Design and workplace controls to maintain doses ALARA (Subpart K, especially Section 835.1003)
- Requirement for routine internal audits (Section 835.102)
- Occupational dose limits (Sections 835.202, 835.206, 835.207, and 835.208)

In addition, self-discovery and reporting of potential violations of 10 CFR 835, and timely implementation of corrective actions, are prompted by Price-Anderson Amendments Act considerations in the same manner as for 10 CFR 830, since violations of 10 CFR 835 are also considered violations of nuclear safety rules.

RCRA/CERCLA Controls

The Resource Conservation and Recovery Act (RCRA) and corresponding state laws regulate the treatment, storage and disposal of listed and characteristically hazardous wastes and hazardous wastes mixed with radioactive components ("mixed wastes"). In addition, RCRA establishes "Corrective Action" requirements to respond to releases of hazardous/mixed wastes from solid waste management units. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) establishes requirements for response to releases of hazardous substances, which include radioactive wastes. Independent regulatory oversight is inherent to RCRA as well as CERCLA.

IWSs as discussed herein, are subject to requirements imposed by RCRA, RCRA corrective action, and/or CERCLA. These requirements will be imposed at various stages in the life of the inactive waste site and, in general, will include the following attributes in accordance with the particular disposal or contamination circumstances of the individual site:

- Surface water monitoring;
- Ground water monitoring;
- Operation, surveillance, and maintenance of passive features such as caps, vegetative cover, slurry walls for containment, etc.
- Institutional controls to limit public access to the site and/or to limit use of the contaminated resource.

These requirements are formalized in legal commitments and agreements between the DOE facility and regulators (and, in some instances the contractor). These may take the form of:

- RCRA permit terms and conditions;
- RCRA corrective action orders and/or Corrective Action Decisions;
- CERCLA Records of Decision (RODs);
- regulatory approvals of intermediate actions; and/or
- Federal Facility Compliance Agreements.

Finally, periodic reviews are required. RCRA permits must be reviewed every five years. CERCLA requires a reexamination of the selected remedy (including institutional controls) every five years.

Enclosure 3 to EM-1 Memo on Inactive Waste Site Categorization

Final Hazard Categorization for Inactive Waste Sites

[Note: As of May 17, 2002, the events and assumed values used in determining consequences at inactive waste sites are currently under peer review. Overall conclusions are considered preliminary and will be adjusted accordingly during the peer review process. As such, quantification of some consequence values are not presented at this time.]

Introduction

10 CFR 830, Subpart B requires that facilities with radiological inventory perform a hazard categorization in accordance with DOE-STD-1027. The standard prescribes an initial hazard categorization that is based on gross inventory comparisons to threshold quantities of Table A.1. A final hazard categorization is also permitted for refining hazard categorization results based on a hazard analysis that considers material form, dispersibility, and interaction with energy sources, but not consideration of safety features (ventilation system, fire suppression, etc).

Section 4 of DOE-STD-1027 addresses various considerations for an acceptable hazard analysis. Per the standard's guidelines for applying a graded approach, facilities that are low in complexity typically warrant simplistic, qualitative hazard analysis methods and techniques. The standard cites waste storage as a low-complexity operation for which release mechanisms are intuitive or straightforward.

Based on DOE-STD-1027 guidelines a qualitative hazard analysis has been developed for inactive waste sites. The common features, characteristics and analytical basis among inactive waste sites that meet the criteria of Enclosures 1 and 2 justifies the use of this analysis and the resulting final hazard categorization to all of EM's inactive waste sites across the DOE complex.

IWS Hazard Identification

The hazards expected at inactive waste sites may vary among DOE sites. Radiological inventories consist primarily of contaminated soils and low-level wastes (e.g., contaminated machine parts, PPE, residuals, sludges). Possible constituents include PCBs, organics, metals, and other hazardous agents.

For the purposes of this final hazard categorization, specific quantification of these material inventories is not necessary. The hazard analysis results show that bounding assumptions used for radiological inventories provide a sufficient basis for determining hazard categorization.

Hazard Analysis Discussion

10 CFR 830, Subpart B provides the basic definition for a Hazard Category 3 as having the potential for only "significant localized consequences." DOE-STD-1027 provides further interpretation of HC3 as "facilities that cannot have a significant radiological impact outside of

the facility." In order to create a radiological release of any significance at an inactive waste site (i.e., 10 rem at 30 meters), an accident event would have to take place that possesses the following characteristics:

(1) An initiator would need to be of sufficient magnitude to penetrate into the ground to a depth necessary to impact a radiological source;
(2) A significant amount of energy would need to be imparted to a highly concentrated radiological inventory; and
(3) The radiological source would need to be dispersed in a sufficient amount that results in a significant localized consequence.

Given that waste sites are inactive and no intrusive activities are conducted, there are no process-related initiators of concern that would breach the protective overburden and expose hazardous/radioactive materials. Rather, initiators are limited to a small set of external man-made and natural phenomena events. A summary of the categories of hazards considered is presented in Table 1.

Table 1- Consideration of Hazardous Events

Categories of Hazards	Specific Events	Considerations
Operational	Fire	**Low consequence** –Material is below surface and there is a lack of oxygen to support combustion. Major forest and brush fires have occurred at inactive waste sites with no appreciable impacts on contaminated waste materials
	Loss of confinement	**Low Consequence-** No process initiators. Additionally, the consequences of this event would be bounded by aircraft impact or inadvertent penetration event.
External (Man-Made)	Aircraft Impact	**Low Consequence-** General aviation aircraft crash would be the only credible event. Typical ground penetration for GAA crash is three feet or less (see discussion). This is an analyzed event.
	Inadvertent Penetration of Surface (e.g., Digging)	**Low Consequence-** Event requires excavation of significant quantity of highly concentrated waste material followed by wind dispersion of exhumed materials. This is an analyzed event.

Categories of Hazards	Specific Events	Considerations
	Vehicle Impact	**Low Consequence**- Vehicle would have to significantly penetrate surface and result in a fire. The consequences of this event would be bounded by an aircraft crash, which has more velocity and greater impact angle for penetrating ground.
Natural Phenomena	High Wind/Tornado	**Improbable** – Material is below the surface. Significant crater would first have to be created.
	Seismic	**Improbable**- Event would have to create large surface void and introduce fire ignition source. The consequences of such an event are bounded by "inadvertent penetration" event.

Given the range of postulated events and the rationale given in Table 1, the final hazard categorization focused on two events that were considered to provide the greatest consequences for an IWS. Discussed below are the aircraft crash and inadvertent ground penetration events.

Aircraft Crash Evaluation

Based on the events considered, an aircraft crash that penetrates the overburden, creates a sizeable crater and disperses a high-octane gasoline that results in a fire is one of the most damaging events that can be postulated. With the exception of Rocky Flats Environmental Technology Site[1], EM's Inactive waste sites are not located near airports, and therefore crashes from airport operations (i.e., takeoffs and landings) are not considered. Table B-15 of DOE-STD-3014-96 lists the probabilities per unit area of an air carrier, air taxi, large military craft, and small military crashes for non-airport operations. These values are presented for all DOE sites. The most restrictive value of any aircraft at the worst case DOE site is 2E-06 crashes/mi^2/year. Inactive waste sites can cover large areas, so a value of 20 acres (.03124 mi^2) was considered to be a reasonable bounding size of an IWS. Multiplying this area by the crash probabilities per unit area indicates the annual probability of commercial and military non-airport operations is 6.2 E -08, and therefore is considered incredible.

DOE-STD-3014-96 lists the maximum probability for a general aviation aircraft (GAA) crash per unit area at a DOE site as 3 E-3 crashes/mi^2/year. Using the area of 20 acres, this would place the annual probability at 9.4 E -05. Therefore, this event was considered a credible, though extremely unlikely, event for an IWS.

[1] Since RFETS is near Jeffco Airport, the frequency of an aircraft crash from airport operations is higher than other sites. The only IWS located at RFETS is Pad 903 (asphalted contaminated soil with Pu maching oils) which is 100 m by 100m. Using a crash rate of 1.0E-3/yr/mi2 (based on Kaiser-Hill recalculating the data for the Denver metro area) the crash rate probability is 3.2E-6/yr.

A GAA crash would have to penetrate an IWS protective overburden in order to impact and disperse underground waste materials. Empirical studies or test data could not be found for modeling or predicting GAA crash damage. However, a search of the National Transportation Safety Board (NTSB) accident analysis database[2] was performed for GAA crashes involving fatalities. A sample of accidents for the five year period between 1997 to 2002 showed that 60% of GAA crashes resulted in impact craters that were one foot in depth or less. Another 33% were two feet or less and 6% of crash impacts were three feet or less. No impacts into soil were found beyond three feet in depth.

Inactive waste sites that meet the definitions and criteria of Enclosures 1 and 2 have inherent physical barriers such as soil overburden or engineered caps which have to meet pedigrees established by CERCLA or RCRA. These features must be established in order to reduce hazardous material risks (public, environment, and workers) to acceptable levels as negotiated with EPA and local/state regulators. The depth of protective overburden/caps provided at DOE sites varies depending on risks presented by waste materials and regulatory specifications. For example:

- The Savannah River Site must provide overburden protection of around 6 feet to ensure their caps can resist wildlife intrusion;
- EPA Region 3, which requires at least 10 feet of overburden on all;
- The Nevada Test site must have protective overburden of between 8 to 10 feet;
- Hanford site is the range of five feet or greater of overburden.

Using the general assumption that protective overburden is at a sufficient depth that meets regulatory risk goals, and assuming a maximum size crater of around three feet that could be created by a GAA crash, it is not expected that such an event would inflict sufficient energy on soil terrain to disperse underground waste materials. Therefore, GAA consequences from this event are considered negligible.

Inadvertent Penetration of Ground Surface

Three possible events involving inadvertent ground penetration and three types of contamination areas were evaluated. The contamination areas are identified as a crib, a large waste site (e.g., like that from a large spill from transfer line at Hanford's Tank Farms) and a small waste site (e.g., a drum spill). The first accident type is wind blown erosion over a contaminated site. In this accident, the site either was uncovered by some mechanism or was inadvertently not covered when the contamination occurred. The resuspension is assumed to continue for 24 hours. The large waste site and small waste site are covered by this accident. The contaminated portion of a crib is typically 5 ft below the soil surface. It is not considered credible for a crib to become entirely uncovered. Scenario 2 will cover the partial uncovering of a crib.

[2] NOTE: Data was based on search of GAA accidents involving a fatality for specified five year period using search word "crater." A total of 150 accidents were identified and results were compiled from those investigations in which crater specifications were given (about 62% of accidents reported).

The second accident is the inadvertent digging of a trench through a large contaminated waste site or crib. Typical digging activities occur to locate something that was buried or to bury something like a sewer line or transfer line. Typically, narrow trenches are dug. It is assumed that a trench 50 m long and 1 m wide is inadvertently dug through a crib or a large contaminated waste site. The material from the trench is placed in a 1 m wide strip on either side of the trench, making the contaminated area 3 m wide and 50 m long (note: except for cribs which are usually less than 25 m long). Resuspension of the contaminated material occurs for 24 hrs.

In addition to resuspension, contaminated soil is also made airborne due to dumping of this soil. It is assumed that the bucket of the backhoe has a 1 cubic yard capacity. It is assumed that the trench is 2 m deep. For cribs, only the bottom 0.5 m is contaminated. It is assumed that the large waste site also contains most of the contamination in 0.5 m depth of soil. The size of the operation is judged to be that which could be done in one day. The release mechanism is dumping of 33 one cubic yard loads of contaminated soil from the large waste sites and 17 one cubic yard loads from a crib

For the small contaminated waste site the number of one cubic yard loads assumed dumped are found as follows. Section 3 will argue that the small site is 10 ft in diameter (7.3 m^2). From above, 33 loads come from an excavated area that is 50 m^2. Therefore, 5 one cubic yard loads are dumped in the small site.

The third accident involves a test pit dug into the soil for characterization. The pit is assumed to be dug into a crib. The pit is assumed to be 2 m in diameter and 6 m deep. The contamination starts 1.5 m below the surface and extends to 6 m. The volume of contaminated soil is 14 m^3 or 18 yd^3. The excavated material is assumed to be placed in a layer 1 m deep all around the pit. The total amount of soil brought to the surface is 19 m^3. The ring of soil is 5.3 m in diameter (22 m^2). The area of contamination, assuming the top of the ring of soil that had been removed is covered with contaminated soil, is less than that in Scenario 2. The number of loads dumped is 18, one more than that from a trench through a crib. Therefore, Scenario 3 is bounded by Scenario 2.

Scenario 2 also bounds a test well inadvertently sunk through contaminated soil. Assuming the well is 12 inches in diameter, the extent of contamination would have to be 1100 ft long for the volume to exceed 25 m^3 shown in Scenario 2.

In order to determine a bounding material at risk for Scenario 2, the soil is assumed to be contaminated at a similar level to the Hanford Z-1A Crib. This represents the highest expected plutonium concentrations for IWS at the Hanford site. Information from the Z-1A crib shows that the greatest concentration of ^{239} Pu was 24,000 n Ci/g at 10 ft below the surface (data from PNNL-11978, *Results of the 1998 Spectral Gamma-Ray Monitoring of Boreholes at the 216-Z-1A Tile Field, 216-Z-9 Trench and 216-Z-12 Crib*). This value equates to 4 x 10^{-4} g Pu/g, soil using a specific activity of 0.062 Ci/g or 0.66 g Pu per liter of soil using 1700 g/L as the soil density. Since this value is similar to that from the Z-9 crib, a concentration of 0.7 g Pu per liter of soil will be used in the analysis for resuspension off of or dumping of soil excavated from a crib.

This concentration is reasonable for a crib that received waste from fuel reprocessing plants. It is overly conservative for waste sites that involved spills. By comparison, RPP-10773, *Compressed Gas Accident Parametric Consequence Analysis*, Table 3-8 (page 3-32) provides a dose factor of 1 rem/g of soil or 1700 rem/L of soil based on the worst case documented Tank Farm spill (using a soil density of 1700 g/L). The soil had a concentration of ^{239}Pu of 3300 pCi/g or 10^{-4} g/L of soil.

Using a high wind speed of 9 m/s, applying appropriate release fractions from DOE-HDBK-3010, and assuming resuspension of materials over an 24 hour period, the dose consequences from Scenario 2 are slightly higher than DOE-STD-1027 Hazard Category 3 consequence values (i.e., 10 rem at 30 meters).

Conclusion

The inadvertent penetration event is the bounding event analyzed for inactive waste sites. Although consequences were estimated in the general range of DOE-STD-1027 for Hazard Category 3, assumptions used in the postulation of this event were extremely conservative. These assumptions include defeating physical barriers or access controls that would be in place at an IWS; excavation of a significant amount of material over a short time period; and the presence of a high wind that occurs during the time period when excavated material has been brought to the surface. Additionally, the material concentrations that are postulated are only expected at a small fraction of the entire population of DOE inactive waste sites. Therefore, at the majority of DOE inactive waste sites, it is anticipated that the worst case bounding event would produce consequences that are one or more orders of magnitude lower than DOE-STD-1027 HC3.

References:

1. DOE-STD-3014-96, 1996, *Accident Analysis for Aircraft Crash into Hazardous Facilities*, U.S. Department of Energy, Washington, D.C.

2. ARH-2207, 1971, *216-Z-9 Crib History and Safety Analysis*, Atlantic Richfield Hanford Company, Richland, Washington.

3. DOE-HDBK-3010-94, 1994, *Airborne Release Fractions, Rates and Respirable Fractions for Nonreactor Nuclear Facilities*, U.S. Department of Energy, Washington, D.C.

4. DOE/RL/12074-30-2, 1994, *Dust Mitigation Study for The Environmental Restoration Disposal Facility*, Department of the Army, Walla Walla, Washington.

5. EPA/600, 1985, *Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites*, U.S. Environmental Protection Agency, Washington, D.C.

6. HNF-SD-CP-SAR-021, 2001, *Plutonium Finishing Plant Final Safety Analysis Report*, Revision 3, Fluor Hanford, Inc., Richland, Washington.

7. PNNL-11978, 1998, *Results of 1998 Spectral Gamma-Ray Monitoring of Boreholes at the 216-Z-1A Tile Field, 216-Z-9 Trench and 216-Z-12 Crib*, Pacific Northwest National Laboratory, Richland, Washington.

8. PNNL-12087, 1998, *Hanford Site Climatological Data Summary – 1998,* Pacific Northwest National Laboratory, Richland, Washington.

9. WHC-SD-GN-SWD-30002, 1995, *The GXQ Program Users Guide*, Westinghouse Hanford Company, Richland, Washington.

Enclosure 4 to EM-1 Memo on Inactive Waste Site Categorization

RCRA and CERCLA Regulatory Citations

[The text provided is technically correct but requires some editing for ease of reading. – P. Gubanc, May 17, 2002]

The Resource Conservation and Recovery Act (RCRA) and corresponding state laws regulate the treatment, storage and disposal of listed and characteristically hazardous wastes and hazardous wastes mixed with radioactive components ("mixed wastes"). In addition, RCRA establishes "Corrective Action" requirements to respond to releases of hazardous/mixed wastes from solid waste management units. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) establishes requirements for response to releases, or threats of releases of hazardous substances, which include radioactive substances. Independent regulatory oversight is inherent to RCRA as well as CERCLA.

RCRA and CERCLA both possess specific regulatory requirements that require closed DOE hazardous waste sites to utilize protective covers which serve to isolate the waste from the public, workers and environment. As discussed in Enclosures 2 and 3, these protective covers also serve a beneficial purpose in isolating the waste from potential accident initiators which may disperse hazardous constituents. To substantiate that these requirements do in fact exist and are both relevant and compelling, a brief collection of the relevant citations is offered below for readers not fully versed in the requirements of RCRA and CERCLA. Readers are cautioned that both RCRA and CERCLA are very large regulations and, by necessity, the citations herein are excerpts and therefore should not be further referenced. RCRA and CERCLA citations were copied from the Government Printing Office's website, www.gpo.gov, using the most recent version of the Code of Federal Regulations (July 1, 2001).

Laws Making RCRA and CERCLA Applicable to DOE Hazardous Waste Sites:

The Resource Conservation and Recovery Act of 1976, as amended by the Solid and Hazardous Waste Amendments Act of 1984 ("RCRA"), (42 U.S.C. Section 6901 et seq.). Subchapter VI - *Federal Responsibilities*, Section 6961, discusses the applicability of RCRA to the federal government.

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, (42 U.S.C. Section 9601 et. seq.). Subchapter I – *Hazardous Substances Releases, Liability, Compensation*, Section 9620, discusses the applicability of CERCLA to the federal government.

The Federal Facilities Compliance Act of 1992, Public Law 102-386, October 6, 1992.

RCRA Regulation Citations: Waste site cover system design, approval and maintenance requirements are specified in the RCRA regulations in 40 CFR 264 and 265. Sections 264.117 through 264.120 of Subpart G provide specific requirements regarding closed waste sites.

Section 264, Subparts K and N, provide additional specifics but tie back to Subpart G. Section 265 parallels, and is largely redundant with, Section 264 for those passages of interest below.

40CFR264, Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities.

Subpart G--Closure and Post-Closure
Sec. 264.117 Post-closure care and use of property.
(a)(1) Post-closure care for each hazardous waste management unit subject to the requirements of Secs. 264.117 through 264.120 must begin after completion of closure of the unit and continue for 30 years after that date and must consist of at least the following: (i) Monitoring and reporting in accordance with the requirements of subparts F, K, L, M, N, and X of this part; and (ii) Maintenance and monitoring of waste containment systems in accordance with the requirements of subparts F, K, L, M, N, and X of this part.

(c) Post-closure use of property on or in which hazardous wastes remain after partial or final closure must never be allowed to disturb the integrity of the final cover, liner(s), or any other components of the containment system, or the function of the facility's monitoring systems, unless the Regional Administrator finds that the disturbance: (1) Is necessary to the proposed use of the property, and will not increase the potential hazard to human health or the environment; or (2) Is necessary to reduce a threat to human health or the environment.

(d) All post-closure care activities must be in accordance with the provisions of the approved post-closure plan as specified in Sec. 264.118.

Sec. 264.118 Post-closure plan; amendment of plan.
(a) *Written Plan.* The owner or operator of a hazardous waste disposal unit must have a written post-closure plan. In addition, ... The plan must be submitted with the permit application, in accordance with Sec. 270.14(b)(13) of this chapter, and approved by the Regional Administrator as part of the permit issuance procedures under part 124 of this chapter. In accordance with Sec. 270.32 of this chapter, the approved post-closure plan will become a condition of any RCRA permit issued.

(b) For each hazardous waste management unit subject to the requirements of this section, the post-closure plan must identify the activities that will be carried on after closure of each disposal unit and the frequency of these activities, and include at least: (1) A description of the planned monitoring activities and frequencies at which they will be performed to comply with subparts F, K, L, M, N, and X of this part during the post-closure care period; and (2) A description of the planned maintenance activities, and frequencies at which they will be performed, to ensure: (i) The integrity of the cap and final cover or other containment systems in accordance with the requirements of subparts F, K, L, M, N, and X of this part; and (ii) The function of the monitoring equipment in accordance with the requirements of subparts, F, K, L, M, N, and X of this part; and (3) The name, address, and phone number ...

Subpart K--Surface Impoundments
Sec. 264.228 Closure and post-closure care.
At closure, the owner or operator must:

(1) Remove or decontaminate all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and manage them as hazardous waste unless Sec. 261.3(d) of this chapter applies; or

(2)(i) Eliminate free liquids by removing liquid wastes or solidifying the remaining wastes and waste residues; (ii) Stabilize remaining wastes to a bearing capacity sufficient to support final cover; and (iii) Cover the surface impoundment with a final cover designed and constructed to: (A) Provide long-term minimization of the migration of liquids through the closed impoundment; (B) Function with minimum maintenance; (C) Promote drainage and minimize erosion or abrasion of the final cover; (D) Accommodate settling and subsidence so that the cover's integrity is maintained; and (E) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

(b) If some waste residues or contaminated materials are left in place at final closure, the owner or operator must comply with all post- closure requirements contained in Secs. 264.117 through 264.120, including maintenance and monitoring throughout the post- closure care period (specified in the permit under Sec. 264.117). The owner or operator must: (1) Maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events; (2) Maintain and monitor the leak detection system in accordance with Secs. 264.221(c)(2)(iv) and (3) and 264.226(d), and comply with all other applicable leak detection system requirements of this part; (3) Maintain and monitor the ground-water monitoring system and comply with all other applicable requirements of subpart F of this part; and (4) Prevent run-on and run-off from eroding or otherwise damaging the final cover.

Subpart N--Landfills
Sec. 264.310 Closure and post-closure care.
(a) At final closure of the landfill or upon closure of any cell, the owner or operator must cover the landfill or cell with a final cover designed and constructed to: (1) Provide long-term minimization of migration of liquids through the closed landfill; (2) Function with minimum maintenance; (3) Promote drainage and minimize erosion or abrasion of the cover; (4) Accommodate settling and subsidence so that the cover's integrity is maintained; and (5) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

(b) After final closure, the owner or operator must comply with all post-closure requirements contained in Secs. 264.117 through 264.120, including maintenance and monitoring throughout the post-closure care period (specified in the permit under Sec. 264.117). The owner or operator must: (1) Maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events; (2) Continue to operate the leachate collection and removal system until leachate is no longer detected; (3) Maintain and monitor the leak detection system in accordance with Secs.

264.301(c)(3)(iv) and (4) and 264.303(c), and comply with all other applicable leak detection system requirements of this part; (4) Maintain and monitor the ground-water monitoring system and comply with all other applicable requirements of subpart F of this part; (5) Prevent run-on and run-off from eroding or otherwise damaging the final cover; and (6) Protect and maintain surveyed benchmarks used in complying with Sec. 264.309.

40CFR265, Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities.

(No citations are provided herein since the structure and text of 40CFR265 parallels, and is largely redundant with, 40CFR264 for those passages of interest above.)

CERCLA Regulation Citations: The main goal of cleanup under CERCLA is risk reduction. Specifically, to reduce/minimize the risk to human health and the environment through active treatment of waste materials where practicable and through a combination of engineering controls and institutional controls where treatment is not practicable or for low level, long-term threats. Remedies are developed, reviewed, and a remedy selected based on a set of criteria specified in the regulations. CERCLA uses a Risk Reduction approach to cleanup activities versus a prescriptive remedy.

CERCLA regulations state, 40CFR300.430(a)(i) "the purpose of the remedy selection process is to implement remedies that eliminate, reduce or control risks to human health and the environment...The national goal of the remedy selection process is to select remedies that are protective of human health and the environment, that maintain protection over time and that minimize untreated waste."

The regulations further state, [40 CFR 300.430(a)(iii)(B)] "EPA expects to use engineering controls, such as containment, for waste that poses a relatively low long-term threat or where treatment is impracticable...(F) EPA expects to return usable groundwater to their beneficial uses wherever practicable, within a timeframe that is reasonable given the circumstances of the site. When restoration of ground water to beneficial uses is not practicable, EPA expects to prevent further migration of the plume, prevent exposure to contaminated groundwater, and evaluate further risk reduction."

As previously stated, CERCLA uses a risk based approach to remediation. Remedy selection is based on the ability of the remedy to reduce the risk at a unit to a risk level of 10^{-4} to 10^{-6} (lifetime cancer risk to individual) for carcinogenic contaminants and concentration levels to which the human population may be exposed without adverse effects during a lifetime [40CFR300.430(e)(2)(i)(A)(*2*)]. However, under CERCLA, many cleanup levels for environmental media and specific contaminants are specified and a remedy must be chosen to meet the specified cleanup levels. CERCLA requires (40 CFR 300.430) that Applicable or Relevant and Appropriate Requirements (ARARs) under Federal or State environmental laws must be evaluated and met. This means that any remedy under CERCLA must comply with the substantive requirements of all other environmental regulations where appropriate or applicable. For example, groundwater cleanups must attain the Safe Drinking Water Act standards i.e. Maximum Contaminant levels or MCLs as remedial goals. Specific cleanup levels brought into

play under CERCLA through ARARs are risked based using the 10^{-4} to 10^{-6} risk level. Another example of an ARAR would be if a CERCLA unit was a "landfill" that contained RCRA hazardous waste; then by the CERCLA ARAR requirement, RCRA regulations would be applicable. Therefore the cover system specifications would apply.

The formal process for selection of the final remedy under CERCLA is described in 40CFR300.430(f) and includes provisions for public comment and environmental regulator approval. 40CFR400.430(f)(5) describes how the decision is documented and includes under Sec. 430(f)(5)(iii)(C) a requirement that the decision be revisited every five years if hazardous substances, pollutants or contaminants will remain at the site.

Finally, for some specific CERCLA or Superfund cleanups, the EPA has developed "Presumptive Remedies" that can be applied to specific cleanup activities in order to accelerate cleanup activities. One of the Presumptive Remedies is for "Landfills." Under the EPA program, the presumptive remedy for "landfills" is containment, which includes capping.

Appendix I – List of Potential Ideas

Appendix I
List of Potential Ideas

As discussed earlier in this EM 10 CFR 830, Subpart B, Implementation Study Report, a list of ideas and suggestions was compiled for potential use in streamlining Rule implementation across the EM complex. This list was evaluated and consolidated, and high-value ideas were selected for pursuit during the second half of the study. The final list of potential ideas is provided below and on the following pages, with the author's explanation and assessment of each idea. This Appendix includes both those ideas that were specifically pursued during the second half of the study and those which were not.

To facilitate ease of use, all of the potential ideas are listed in the table below. Ideas that were specifically pursued as part of this study are denoted with an asterisk (*). Ideas are grouped into one of three broad categories (Policy and Guidance, Technical, and Administrative). Within each category, the potential ideas are presented in a generally decreasing order of priority, although there are many factors that may influence one's perspective. These factors include safety benefit, one-time and/or life-cycle cost savings, schedule considerations, likelihood of success, difficulty and significance of change to existing Rules and/or standards, and precedence for use. The status of implementing each idea is also summarized. Following this table, each potential idea is presented separately in a standardized format.

Table 1. Potential Ideas

PI #	Title/Description	Status
Category - POLICY & GUIDANCE		
P01 *	Develop EM-1 guidance regarding processing of Rule exemptions, facility hazard categorization, and implementation of approved safety basis documents.	As of May 22, 2002, the guidance has been drafted and is in the concurrence chain. The draft memorandum is provided in Appendix G.
P02	Develop DOE guidance on the application of 10 CFR 830, Subpart B, to transportation of nuclear materials.	The Albuquerque Operations Office and others are driving this effort. EH and EM are forming a joint working group to prepare an implementation guide.
P03	Develop a model for a DSA prepared in accordance with DOE-STD-1120-98, *Integration of Environment, Safety and Health Into Facility Disposition Activities*.	The Richland Operations Office has recently prepared contractor guidance on how to prepare a DSA per DOE-STD-1120-98. DOE-EH is also preparing to update DOE-STD-1120-98.
P04	Develop the EM position on chemically hazardous and/or below Hazard Category 3 nuclear facility safety bases.	An archived Order and standard are still being used in the absence of current DOE guidance.

PI #	Title/Description	Status
P05	Amend or supplement 10 CFR 830, Subpart B, to address facilities/activities not traditionally managed with consequence-based controls.	The movement to NRC regulation is another means to achieve this same result.
P06	Develop a proposal to eliminate the distinction between Hazard Category 2 and 3 facilities.	None.
P07	Develop a proposal to adjust the threshold for DOE approval of safety bases.	None.
P08	Establish criteria for discontinuing DOE Headquarters environment, safety, and health oversight of EM site contractors, and model it after the NRC's process with agreement states.	None.
P09	Develop a generic USQ process flowchart.	Several different versions currently exist across the complex.
P10	Develop EM guidance on the appropriate level of detail in DSA programmatic chapters.	Each site requires a widely disparate level of detail.
P11	Establish EM-wide evaluation guidelines for on-site workers and chemical hazards.	Each site currently has its own unique version.
Category – TECHNICAL		
T01 *	Issue an EM-1 decision memorandum that the final hazard categorization of EM inactive waste sites is to be below Hazard Category 3.	On May 17, 2002, newly developed technical basis information suggested that the direction of this draft memorandum may require amendment.
T02 *	Define a model/method for demonstrating facility performance to the Hazard Category 3 lower threshold dose criterion.	This issue is pending a formal EM request for EH support.
T03 *	Issue alternate ARFs for EM-unique nuclear hazards/facilities.	The path forward has been established and funded, and EM-5 is working this issue.
T04 *	Broaden the use of performance-based TSRs and "Step Out Criteria" for decommissioning activities.	This idea is in use at Rocky Flats.
T05	Utilize International Commission on Radiological Protection (ICRP) 68 versus ICRP 30 as the inhalation model for estimating doses.	This idea is in use for select facilities at INEEL, Rocky Flats, SRS, and others.
T06 *	Standardize accident analysis methods by completion and issuance of the draft "DOE Accident Analysis Handbook."	This effort is funded, and DOE and NNSA are working it.
T07 *	Standardize site-specific accident analysis methods by developing site-specific analysis handbooks.	This idea is in use at Rocky Flats. Hanford is developing its own version based on the Rocky Flats model.

PI #	Title/Description	Status
T08 *	Automate standardized, site-specific accident analysis by developing site-specific computer tools.	These tools are in use at Rocky Flats. Hanford is developing its own based on the Rocky Flats model.
T09 *	Develop site-wide, generic safety basis documents.	Many sites already have such documents. Bechtel BWXT Idaho, LLC (BBWI), has the most streamlined version.
T10	Develop site-wide waste management safety basis documents.	Many sites already have such documents.
T11	Develop complex-wide, generic documented safety analyses for broad EM mission areas.	The Richland Operations Office "Surveillance & Maintenance Documented Safety Analysis" is currently being drafted and may serve as a model.
T12	Establish screening criteria for defining "common industrial hazards" for hazards analysis.	The Draft DOE Handbook SAFT-0085, "Integration of Multiple Hazard Analysis Requirements and Activities," dated April 2002, provides a concept.
Category – ADMINISTRATIVE		
A01 *	Flowchart the safety basis development, review, and approval process to identify efficiency opportunities.	Bechtel's Six Sigma efforts have been completed at INEEL and Oak Ridge.
A02	Utilize an "authorization basis list" to manage applicability of multi-facility safety bases.	This is in use at INEEL and SRS.
A03	Utilize 10 CFR 830-derived checklists for safety basis completeness reviews.	This is in use at Hanford and INEEL but at different levels of detail.
A04 *	Develop an EM Headquarters safety basis web page.	EM-7 is currently working to create this web page.
A05	Establish a collection of EM-endorsed final hazard categorization examples for use at other sites.	None.
A06	Utilize an integrated hazard analysis team and process to maximize consistency and efficiency.	There are a limited number of success stories across complex.
A07	Develop and verify management's and DOE's expectations early in the safety basis development process.	There are a limited number of success stories across complex.
A08	Utilize DOE and/or contractor committees to address site-level safety basis policy, technical judgement, and consistency issues.	This is in use at several sites, such as Hanford, Oak Ridge, and SRS.

PI #	Title/Description	Status
A09	Publish the draft DOE Handbook SAFT-0085, "Integration of Multiple Hazard Analysis Requirements and Activities," dated April 2002.	EH-52 (lead) has the draft handbook in review.
A10	Request EM sites to self-evaluate their safety basis practices for efficiencies.	None.
A11 *	Formalize the quality assurance process for the generation of EFCOG documents.	The initial language is pending the EFCOG Directors' approval. Follow-on language using an ASME model is working.
A12	Request the EFCOG SAWG to address complex-wide issues that influence EM costs and schedules.	Specific tasks are being performed but not in a concerted, coordinated approach.
A13	Develop methods to assess, standardize, and focus limited EM safety basis expertise.	None.
A14	Create a DOE SAWG to parallel the EFCOG SAWG.	None.
A15	Develop an integrated EM 10 CFR 830, Subpart B, implementation plan.	Each site has a plan to implement 10 CFR 830, Subpart B, although the format and level of detail are variable.
A16	Develop EM complex-wide, compatible safety basis web sites to improve data sharing.	Each site typically has a safety basis web site. Their compatibility with each other was not assessed.
A17	Clarify and reduce USQ recordkeeping requirements.	None.

Potential Idea Number: P01*

Title/Description: Develop EM-1 guidance regarding processing of Rule exemptions, facility hazard categorization, and the implementation of approved safety basis documents.

The primary purpose of this guidance is to reduce uncertainty in the field regarding:
1. EM's expectations for, and processing of, 10 CFR 830, Subpart B, exemptions.
2. Clarification on using and managing the nuclear facility hazard categorization process to permit efficient use of resources and avoid common oversight concerns.
3. EM's expectations on implementing approved safety basis documents and how these implementation considerations must be formally addressed and controlled to avoid Rule noncompliances and hidden cost/schedule impacts.

Location(s) Already in Use	Key References	Key Personnel
None	The draft EM-1 memorandum is attached as Appendix G	Maria Gavrilas-Guinn, EM-5

Candidate EM Sites for Use: All

Actions Required to Implement:
1. EM field offices contractually convey and apply the memorandum guidance to their respective EM operating contractors.
2. EM field personnel and contractors implement the guidance in local instructions, procedures, and practices.
3. EM Headquarters personnel verify and assess implementation.

Barriers to Implement:
None, although incorporation of this guidance into the parent standards (e.g., DOE-STD-1027-92, DOE-STD-1104-96) would extend the benefits beyond EM and provide greater permanency. EM has drafted a memorandum to EH making this suggestion.

Safety, Cost, and/or Schedule Benefit:
Benefits were not specifically estimated for this item, although it is expected to:
1. Improve safety by assuring more reliable safety basis implementation, which has been a major concern in the past at some EM sites.
2. Reduce costs by avoiding preparation of unnecessary safety basis documentation and reducing the vulnerability to oversight/enforcement findings.
3. Improve exemption approval schedules by clarifying exemption package content requirements and EM Headquarters' roles and responsibilities.

Potential Idea Number: P02

Title/Description: Develop DOE guidance on the application of 10 CFR 830, Subpart B, to transportation of nuclear materials.

Title 10 CFR 830, Subpart B, Appendix A, Table 2, clearly includes transportation within the scope of the Rule. Concerns exist with application of the Rule to transportation for facility hazard categorization, USQs, and TSRs. There are highly energized and divergent opinions between the sites that will probably require both safety basis and transportation expertise to resolve. This same concern also exists regarding the transportation of nuclear explosives.

Location Already in Use	Key References	Key Personnel
Each site currently uses its own method.	10 CFR 830, Appendix A, Table 2	Ashok Kapoor, Albuquerque Operations Office, National Transportation Program
	DOE O 460.1A	Mike Wangler, EM-5, and Carol Peabody, EM-24
	DOE O 461.1	Dick Black, EH-53

Candidate EM Sites for Use: All

Actions Required to Implement:
1. EH-53 has agreed to work with EM to establish a team to prepare a transportation implementation guide. (A revision to DOE O 460.1A is also being discussed.)
2. Once an implementation guide is issued, the guide will require promulgation and probably training workshops to facilitate consistent use and understanding.

Barriers to Implement:
1. The fundamental approach in 10 CFR 830 (consequence-based controls) is not the approach traditionally used in the transportation community (which uses deterministic design-based controls), thus leading to major disconnects in understanding and types of safety documentation and analysis.
2. Implementation of DOE O 460.1A, which is the 10 CFR 830 safety analysis "safe harbor" for transportation, varies from site to site.
3. DOE implementation guidance, even if issued immediately, may not support the 10 CFR 830 compliance date of April 10, 2003. A temporary exemption to the Rule compliance date may be necessary for some sites.

Safety, Cost, and/or Schedule Benefit:
Benefits were not specifically estimated for this item, although it is expected that failure to address this major issue across the complex may have significant safety and cost ramifications as sites conservatively apply the Rule requirements and/or significantly delay shipping efforts until compliance can be assured. This may result in excessive levels of documentation being prepared and hazardous materials being accumulated rather than being promptly disposed. Transportation is a weekly, if not daily, necessity at most sites; thus, these impacts are already being experienced across the complex.

Potential Idea Number: P03

Title/Description: Develop a model for a DSA prepared in accordance with DOE-STD-1120-98, *Integration of Environment, Safety and Health Into Facility Disposition Activities*.

10 CFR 830, Subpart B, Appendix A, Table 2 identifies a list of "safe harbor" methods for preparing rule-compliant DSAs. For decommissioning activities, Table 2 permits the use of methods in DOE-STD-1120-98 and the provisions of 29 CFR 1910.120 (also known as HAZWOPER). Unfortunately, DOE-STD-1120-98 is written in a form that provides a compendium of considerations, not a "method." Also, the Health and Safety Plan prescribed by HAZWOPER is viewed by many DOE contractors as a document that is not appropriate for approval and control at the DSA level. Given these questions and the significant number of EM facilities that could be covered under this safe harbor, a model for how to utilize this safe harbor is needed.

Locations Already in Use	Key References	Key Personnel
	DOE-STD-1120-98	Tony Eng, EH
	Richland Operations Office *Expectations on Documented Safety Analyses for Deactivated, Inactive Nuclear Facilities in a State of Long-term Surveillance and Maintenance or Decommissioning*, April 15, 2002	Shirley Olinger, Richland Operations Office Jeff Woody, Link Technologies, Inc.

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Evaluate the above Richland Operations Office document for regulatory compliance and use at other EM sites.
2. Distribute this guidance for use at other sites and/or prepare EM-wide guidance in this area.
3. Establish an EM task team to work with EH to revise DOE-STD-1120-98 to address the areas where additional or more explicit guidance is considered necessary.

Barriers to Implement:
1. The Richland Operations Office guidance has not yet received extensive regulatory review. Some passages may be judged to be in conflict with Subpart B (e.g., guidance regarding formatting and annual updates of DSAs).
2. Finalizing and promulgating this guidance EM-wide may not support the April 2003 Subpart B due date. Despite this, there will still be a significant number of future decommissioning activities that can benefit from this guidance.

Safety, Cost, and/or Schedule Benefit:
1. Integration, as opposed to redundant layering, of the Subpart B safety basis requirements with those of HAZWOPER will enhance safety, since workers will be provided more streamlined and obvious requirements for their understanding and compliance.

2. DOE already has a significant investment in safety management programs such as HAZWOPER and Integrated Safety Management. Allowing sites to credit these programs and their efficient integration in the Subpart B DSA should provide cost savings and schedule improvements, although specific estimates of what these might be were not made.

Potential Idea Number: P04

Title/Description: Develop the EM position on chemically hazardous and/or below Hazard Category 3 nuclear facility safety bases.

EM facilities that present significant hazards but which are categorized as below Hazard Category 3 in accordance with 10 CFR 830, Subpart B, are no longer addressed by DOE requirements and standards (e.g., explosive or shock-sensitive chemical storage). DOE 5481.1B and DOE-EM-STD-5502-94, both now cancelled, established expectations for preparing ASAs, especially for facilities with significant chemical hazards. EM sites continue to use ASAs, often including controls which assure that facilities remain below Hazard Category 3 or below OSHA 29 CFR 1910.119 hazardous chemical limits. EM needs to evaluate the safety, cost, and management implications of not renewing or replacing DOE-EM-STD-5502 and DOE 5481.1B.

Locations Already in Use	Key References	Key Personnel
Most sites have retained the requirement contractually to have ASAs.	DOE 5481.1B DOE-EM-STD-5502-94	Sandra Johnson, EM-5

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Compile a list of those EM contracts that currently retain the elements of DOE 5481.1B and DOE-EM-STD-5502-94.
2. Assemble an EM task team to evaluate the safety, cost, and management implications of not having renewed this DOE Order and standard.
3. Obtain EM management's decision/agreement on whether there are any vulnerabilities that require redress and the methods for doing so.
4. Execute EM management's direction.

Barriers to Implement:
None.

Safety, Cost, and/or Schedule Benefit:
1. The safety benefit of formally managing DOE's highly hazardous, non-nuclear or below Hazard Category 3 nuclear facilities did not diminish when the Order and standard were permitted to expire without replacement. The fact that most sites have retained the requirements suggests that this is a needed safety management function.
2. Given that most sites have retained these requirements, the renewal of the EM policy in this area is not expected to be a major cost driver. In some cases, this may actually result in cost savings as overly conservative, site-level interpretations are reduced.
3. The costs of a safety mishap (e.g., investigation, corrective action management, lost productivity, efforts to regain public trust, financial penalties) can be substantial. This study did not attempt to estimate the level of such cost avoidance that this idea may provide.

Potential Idea Number: P05

Title/Description: Amend or supplement 10 CFR 830, Subpart B, to address facilities/activities not traditionally managed with consequence-based controls.

As described in Section 5, Major Conclusions, the approach employed by 10 CFR 830, Subpart B, is heavily biased towards the performance of hazards and accident analysis, the determination of health consequences, and the specification of controls to keep consequences within acceptable guidelines. Some types of facilities/activities, such as transportation and hazardous chemicals work, have not traditionally been managed this way. While safety in these areas is approached in a different manner, the methods used are equally valid and can be equally effective. The one-size-fits-all approach of Subpart B demands such a broad range of flexibility and interpretation that significant resources must be expended at every site to address very similar problems. While an EM-wide initiative could reduce some of these inefficiencies, more closely focused regulations, tailored to the specific type of facility or activity, would be a more effective means to reduce these variabilities and inefficiencies.

Locations Already in Use	Key References	Key Personnel
NRC	EM 10 CFR 830, Subpart B, Implementation Study Report, Figure 1 (see page 8)	Dick Black, EH-53

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Identify the types of facilities/activities traditionally managed for safety by means other than consequence-based controls.
2. On a case-by-case basis, identify areas that merit specific treatment with their own tailored requirements. (Current DOE initiatives on transportation [P02], decommissioning [P03], and external regulation are examples of where a perceived need has been identified.)
3. Making certain classes of DOE facilities (e.g., multipurpose laboratories) subject to NRC regulation is another means of achieving this same result.

Barriers to Implement:
1. Rulemaking is an extended process that requires significant resources to accomplish.
2. Principle contributors to 10 CFR 830, Subpart B, view with suspicion other means of managing safety, citing specific instances where these other methods failed to adequately protect human health and safety. (The same could be said by others about DOE's safety record.)
3. NRC has groups of experts, each of whom specialize in a specific area of NRC regulation. DOE has placed most of this burden on one group (i.e., EH-53), which has approximately 20 full-time employees and is not staffed sufficiently to possess and maintain an expert level of knowledge in all of these potential areas.

Safety, Cost, and/or Schedule Benefit:
The one-size-fits-all approach of Subpart B demands such a broad range of flexibility and interpretation that significant resources must be expended at every site to address very similar problems. The debate over external regulation, which is partially rooted in this issue, has been ongoing for over six years. The current debate over addressing transportation under 10 CFR 830 has gone on for the past six months, and at the current rate, it will go on for another six to twelve months more. While specific safety and cost benefits were not estimated, the evidence appears to suggest that addressing these areas with more appropriate regulation would reduce the debates to more technically manageable matters.

Potential Idea Number: P06

Title/Description: Develop a proposal to eliminate the distinction between Hazard Category 2 and 3 facilities.

Title 10 CFR 830, Subpart B, identifies requirements that apply only to facilities classified per DOE-STD-1027-92 as Hazard Category 1, 2, or 3 nuclear facilities. DOE Hazard Category1 facilities are few in number and so are not discussed further. Hazard Category 2 facilities are defined as those having a potential for "significant on-site consequences." Hazard Category 3 facilities are defined as those having a potential for "significant but localized consequences." Certain DOE Orders/standards requirements (e.g., DOE-STD-3009-94) apply more rigor to Hazard Category 2 than Hazard Category 3 facilities. The perception of field personnel is that Hazard Category 2 facilities receive more scrutiny and higher expectations than Hazard Category 3 facilities.

Some sites have expended considerable energy to justify recategorizing Hazard Category 2 facilities as Hazard Category 3. Others have been engaged in exhaustive debates on how the rigor of analysis differs depending on the hazard category. This effort appears misguided to some (i.e., the level of interest, analysis, etc., should depend on the hazards inherent in the facility and its operations, not the hazard category). Eliminating the distinction between Hazard Category 2 and Hazard Category 3 might permit a more useful and valid focus of effort.

Locations Already in Use	Key References	Key Personnel
	DOE-STD-1027-92	EH-53
		Carol Sohn, Oakland Operations Office

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Identify those DOE Rules, Orders, and standards that apply a differing level of rigor as a function of the hazard category. These would include 10 CFR 830, DOE O 425.1B, and DOE-STD-3009-94.
2. Determine whether the value added by eliminating the distinction between Hazard Category 2 and Hazard Category 3 would merit the cost of the change.
3. Make a DOE decision on how best to proceed.

Barriers to Implement:
1. Eliminating the distinction between Hazard Category 2 and Hazard Category 3 would probably require revision to some DOE Rules, Orders, and/or standards.
2. Those charged with overseeing public and worker safety and health inside and outside DOE might view this idea as a means of obviating the more rigorous application of requirements to Hazard Category 2 facilities.
3. As has been seen in other areas where DOE has afforded flexibility in standards, significant variability in practices from site to site can result if strong central leadership is not provided.

Safety, Cost, and/or Schedule Benefit:
The safety, cost, and schedule benefits of this idea are not readily obvious to Mr. Gubanc, the EM 10 CFR 830, Subpart B, Implementation Study Leader.

Potential Idea Number: P07

Title/Description: Develop a proposal to adjust the threshold for DOE approval of safety bases.

Title 10 CFR 830, Subpart B, clearly distinguishes a difference in the level of rigor and control applied to facilities above and below the Hazard Category 3 threshold defined in DOE-STD-1027-92. As discussed in Attachment 1 of DOE-STD-1027-92, this threshold was established by DOE senior management in 1992 based on Environmental Protection Agency and other criteria. An upward adjustment of the Hazard Category 3 threshold would potentially expose DOE to more risk, but it would also reduce the regulatory burden. Alternatively, DOE could retain the current hazard categories but permit contractors to qualify for self-approval authority of Hazard Category 3 DSAs. OSHA's Voluntary Protection Program represents an example of how one federal agency shifted its regulatory burden.

Locations Already in Use	Key References	Key Personnel
N/A	OSHA Voluntary Protection Program	Shirley Olinger, Richland Operations Office

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Perform a cost-benefit analysis as the first step in judging the potential value of pursuing this idea.
2. Assuming a case to proceed is made, evaluate and select the option(s) to pursue. This may include creation of a methodology for contractor qualification for self-approval of DSAs.
3. Amend the Rules, Orders, and/or standards, as necessary to implement. Rulemaking will require the solicitation and resolution of public comments.

Barriers to Implement:
1. This idea would certainly require either a revision to DOE-STD-1027-92 and/or 10 CFR 830.
2. The cost-benefit analysis suggested above needs to balance cost versus human risk, which is never an easy comparison and one that has significant emotional appeal (e.g., money versus lives).
3. Those charged with overseeing public and worker safety and health inside and outside DOE are not expected to be enthusiastic about this idea.

Safety, Cost, and/or Schedule Benefit:
An analysis of safety basis development, review, and approval costs by BBWI estimates that roughly half of the cost is attributable to the review and comment resolution process. DOE review, comment resolution, and approval can be a significant portion of this half. The above change would permit some of these costs to be avoided but could expose the DOE to an increased risk. The costs of implementing the above idea are also expected to be substantial.

Potential Idea Number: P08

Title/Description: Establish criteria for discontinuing DOE Headquarters environment, safety, and health oversight of EM site contractors and model it after the NRC's process with agreement states.

Section 274 of the Atomic Energy Act (42 United States Code 2021) tasks the NRC to cooperate with the states and allow for their assumption of regulatory tasks from the NRC. On January 23, 1981, in 46 Federal Register 7540, NRC published its *Criteria for Guidance of States and NRC in Discontinuance of NRC Regulatory Authority and Assumption Thereof by States Through Agreement* (later amended in 46 Federal Register 36969 and 48 Federal Register 33376). Successful satisfaction of the criteria by an Agreement State results in the NRC's regulatory focus shifting to overseeing the Agreement State itself but not the licensees. Allowing DOE field offices to similarly qualify for such authority would help shift DOE Headquarters from auditing DOE's contractors (which the contractors consider an excessive burden) to focusing on DOE field office performance and accountability.

Locations Already in Use	Key References	Key Personnel
NRC currently lists 32 Agreement States on its web site	Key NRC references can be found at http://www.nrc.gov/what-we-do/state-tribal/agreement-states.html	The NRC Regional Offices are the primary interface with Agreement States.

Candidate EM Sites for Use: Only those with a long-term, future DOE presence

Actions Required to Implement:
1. Develop in-depth expertise in the NRC Agreement State processes and procedures.
2. Evaluate the 36 specific criteria established by NRC for relevance and any adjustments needed to make them applicable to a DOE field office.
3. Establish the DOE Headquarters authority for administering the agreement program and the remedies available should the conditions of the agreement not be met.

Barriers to Implement:
1. This would establish a level of rigor and formality that some may view as excessive and unnecessary for DOE Headquarters to delegate responsibilities to the field.
2. Those in DOE Headquarters charged with field oversight may view such an agreement as an unsatisfactory limitation to their authority and autonomy to pursue performance issues.
3. The NRC criteria and process are clearly focused on nuclear safety regulation. DOE, as both owner and regulator, has a much broader set of concerns than does NRC (e.g., chemical safety, program performance, and cost).

Safety, Cost, and/or Schedule Benefit:
Implementing this idea may provide a certain amount of oversight relief to DOE contractors and would provide a formal process by which both DOE Headquarters and field elements could assure that responsibilities and expectations are mutually understood and satisfied.

Potential Idea Number: P09

Title/Description: Develop a generic USQ process flowchart.

Title 10 CFR 830, Subpart B, requires each contractor to establish a DOE-approved USQ process. DOE G 424.1-1, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements*, is a 35-page document that describes the DOE USQ process, yet it contains not a single graphic or flowchart to convey understanding. In addition, the guide does not fully describe the USQ screening processes required as part of the USQ process (e.g., "new information" for potential discovery USQs). Having a simple, one-page USQ process flowchart would be an especially useful training tool for management, auditors, and new USQ evaluators. Some EM sites and contractors already possess templates that could be easily adopted and enhanced. The EFCOG SAWG appears ideally positioned to address this need.

Locations Already in Use	Key References	Key Personnel
	DOE G 424.1-2	Dick Englehart, EH-53
		Jerry Hansen, Westinghouse Safety Management Solutions, LLC (WSMS) and Tammy Hobbes, BBWI, EFCOG SAWG Co-Chairs

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Convene a contractor working group to assemble a collection of possible templates and identify issues and concerns with creation of a one-page, generic USQ flowchart that is suitable for incorporation into DOE G 424.1-1.
2. Develop a USQ flowchart for consideration to be promulgated among the DOE contractor community, EM-wide, or DOE-wide.

Barriers to Implement:
1. The authors of DOE G 424.1-1 consider it adequate and that the proposed flowchart, while a possible enhancement, is not essential and is readily obtained through other sources.
2. The USQ process required by DOE requires, but does not describe, the screening processes in advance and support of the USQ process. DOE may view explicit treatment of the screening process as too narrowly or overly prescribing the screening process.
3. DOE contractors have developed site-specific screening processes tied to their organizational structures. The screening processes may not be amenable to a generic description.

Safety, Cost, and/or Schedule Benefit:
During the author's eight years as a DNFSB Site Representative, discovering confusion and misunderstanding of the USQ process was a repeated finding. Just the exercise of attempting to develop this generic flowchart is expected to reveal gaps in understanding of the process, even by those viewed as "experts." If the process is as well understood as some contend, the flowchart should be easily generated, and once DOE has endorsed it, it will serve as a valuable training tool across the complex.

Potential Idea Number: P10

Title/Description: Develop EM guidance on the appropriate level of detail in DSA programmatic chapters.

As discussed in DOE-STD-3009-94, Chapters 6 through 17 of a SAR (a type of DSA) address programmatic aspects of nuclear facility operation (e.g., emergency preparedness and training). Based on the author's review, the expectations of DOE's sites on the level of detail in these chapters vary widely, and in some cases, they are driving excessive costs and useless levels of detail. (Two EM sites, addressing the same basic chapters, produced two documents that measured ½" and over 6", respectively.)

DOE guidance in this area is not clear. DOE-STD-3009 does not clearly identify the intended users of the programmatic chapters (e.g., USQ evaluators judge the significance of program breakdowns versus assessors and operators focus on key aspects of programs). DOE-STD-1104-98, Section 2.5, directs DOE reviewers to look for "basic provisions" when the real focus should be on key facility-specific provisions (e.g., what specific elements of the site-level fire safety program are depended upon by the facility?). As both owner and regulator, DOE has other contract mechanisms to drive site-level programs and, thus, is not solely dependent on the DSA programmatic chapters to define the programs. In the absence of clear DOE-wide guidance, EM should define the level of detail expected in the DSA programmatic chapters.

Locations Already in Use	Key References	Key Personnel
	DOE-STD-3009-94	EH-53
	DOE-STD-1104-98	
INEEL	SAR-100	Jerry Paulson, BBWI
SRS	SRS "Generic SAR"	Jeff Harvey, WSMS

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Collect examples of DSA programmatic chapters across the EM complex for instructional purposes. (Start with the two references listed above.)
2. Based on the magnitude of the issue and expediency, decide whether to address this matter through active communication with the sites, EM-specific guidance, or DOE-wide guidance.

Barriers to Implement:
The keepers of the above DOE standards believe the existing guidance is sufficient.

Safety, Cost, and/or Schedule Benefit:
1. Excessively bloated safety documents detract from safety because they are too intimidating to be used.
2. Unnecessary levels of detail serve to dilute the attention and focus of the users and provide easy fodder for oversight personnel who seek to find contradictory statements or confusing guidance. This does not significantly enhance safety, and it certainly adds to DSA preparation and operating costs.

Potential Idea Number: P11

Title/Description: Establish EM-wide evaluation guidelines for on-site workers and chemical hazards.

DOE-STD-3009-94, Appendix A, currently defines only a radiological dose evaluation guideline of 25 rem. Utilizing the format suggested by DOE-STD-3009, many sites have prepared a matrix, or "stairstep," of evaluation guidelines to plot consequence versus probability for both radiological and chemical hazards. The sites have found this practice beneficial for their use despite the cautions in DOE-STD-3009 and DOE G 421.1-2 that such guidelines may result in excessive "pencil sharpening" to justify that the consequences are below the guideline values. Given the large margin for error inherent in such calculations (e.g., a factor of 10), this concern is valid.

Locations Already in Use	Key References	Key Personnel
Each EM site has its own unique version.	DOE-STD-3009-94	Dick Black, EH-53 Rich Stark, EH-53
		Patrice McEahern, Strategic Management Initiatives, Inc. (SMI)
		Bob Lowrie, WSMS
	10 CFR 70, NUREG-1520	Drew Persinko, NRC

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Develop a set of uniform evaluation guidelines for use across the EM complex and obtain agreement from all EM sites and EH.
2. Obtain agreement from all EM sites to convert to and utilize a consistent analysis methodology such that the evaluation guidelines would be relevant for all sites.

Barriers to Implement:
1. Evaluation guidelines are inherently coupled to the level of analysis typically applied. An evaluation guideline found perfectly suitable for rough-order-of-magnitude calculations may be nonconservative if applied to high precision calculations. Thus, the analysis methodology must also be standardized if one wants to standardize the evaluation guidelines.
2. Each site has its own tailored set of evaluation guidelines, and some have multiple sets, depending on the past history and regulatory approach (e.g., Hanford).

Safety, Cost, and/or Schedule Benefit:
Benefits were not specifically estimated for this item, although it is expected that the costs inherent in standardization would exceed any near-term benefits. This is particularly true in the radiological area, where each site has significant expertise and investment in a particular position. Chemical hazards, however, are a relatively new area, and one that is currently lacking in DOE guidance. Consideration of NRC's approach to evaluating hazards in 10 CFR 70.61 and NUREG-1520 may serve as a useful benchmark.

Potential Idea Number: T01*

Title/Description: Issue an EM-1 decision memorandum that the final hazard categorization of EM inactive waste sites is to be below Hazard Category 3.

There are over 5,000 EM inactive waste sites, and the safety management of them is dominated by environmental and other regulations. Given the large number of inactive waste sites and the low risk associated with them, EM does not see sufficient benefit to creating safety bases for inactive waste sites under 10 CFR 830, Subpart B. While several DOE sites have never considered inactive waste sites as "nuclear facilities," extensive discussions with EH indicated that it was more expeditious to justify inactive waste sites as being below Hazard Category 3 than to attempt to obtain a Rule interpretation placing inactive waste sites outside of the nuclear facility definition. This issue is discussed in greater detail in Appendices H1 and H2.

On May 17, 2002, the analysis in support of this hazard categorization approach revealed that an inadvertent intrusion accident scenario might exceed the Hazard Category 3 dose criterion. While this result validates the obvious benefits of placing such wastes under soil and engineered covers, it does not support compliance with DOE-STD-1027-92 as currently written. EM will need to evaluate alternatives such as the following:

a. Placing a radionuclide concentration limit in the exemption's inactive waste site definition.
b. Converting the exemption package into a generic DSA that is expected to demonstrate that the existing environmental regulatory controls are sufficient.
c. Permanently exempting inactive waste sites from 10 CFR 830, Subpart B, on the basis that other regulations already impose sufficient controls to protect the public, workers, and environment.
d. Returning to the argument that inactive waste sites were never intended to fall within the definition of "nuclear facilities" under the Rule.

Locations Already in Use	Key References	Key Personnel
	Draft EM-1 memorandum (see Appendix H2)	Shirley Olinger, Richland Operations Office
	DOE-STD-1027-92	Dick Black, EH-53

Candidate EM Sites for Use: All, but especially those sites with large numbers of inactive waste sites, such as Hanford, INEEL, Nevada Test Site, Oak Ridge, and SRS

Actions Required to Implement:
EM must determine how best to proceed with the exemption package (see Appendix H2) based on the accident analysis results provided on May 17, 2002.

Barriers to Implement:
1. Possible noncompliance with the DOE-STD-1027-92 dose criterion as discussed above.
2. The technical justification asserts that existing environmental regulations will keep inactive waste sites isolated and maintained without the need to impose 10 CFR 830, Subpart B. While EM contends this to be the case, others may question this assertion.

3. Due to the large number of facilities and the wide variety of wastes and configurations involved, there is a strong desire to provide absolute assurance that no inactive waste sites could possibly exist outside the bounds of the justification. This tendency leads to ever-increasing levels of detail to which it becomes progressively harder to demonstrate compliance. Notwithstanding this additional analysis, the conclusions about safety controls remain the same (i.e., it is hard to do much more with a soil-covered waste pile that isn't already required by environmental and other regulations).

Safety, Cost, and/or Schedule Benefit:
The cost to develop, review, and approve a DOE-approved final hazard categorization is estimated at 50 man-hours (approximately $5,000). [For comparison, the level of EM effort expended on this one item to date exceeds 350 man-hours, or $35,000.] The expected cost benefit depends on how many hazard categorization packages the 5,000+ inactive waste sites would be bundled into. Assuming 100 such documents, the potential cost benefit would be in the neighborhood of $500,000. A potential safety benefit is also expected because site safety analysts will able to focus on higher risk matters.

Potential Idea Number: T02*

Title/Description: Define a model/method for demonstrating facility performance to the Hazard Category 3 lower threshold dose criterion.

DOE-STD-1027-92 describes the method for categorizing nuclear facilities in support of 10 CFR 830, Subpart B. DOE-STD-1027, Attachment 1, Table A.1, provides the radionuclide inventory limits for categorization, and exceeding these inventory values defines the facility as a preliminary Hazard Category 2 or 3. Section 3.1.2 allows for performing final categorization of a facility with Hazard Category 2 or 3 inventories to a higher or lower hazard category by taking into consideration material quantity, form, location, dispersibility, and interaction with available energy sources. DOE-STD-1027-92 provides explicit dose criteria for performing this final categorization.

DOE-STD-1027 describes the specific calculation model to be used to assess against the Hazard Category 2 dose criterion. For Hazard Category 3, however, the model is not described. As a result, sites' attempts to justify that a nuclear facility is below Hazard Category 3 are more difficult to develop and more variable in their technical approach.

Locations Already in Use	Key References	Key Personnel
	DOE-STD-1027-92	Dick Englehart, EH-53
		Maria Gavrilas-Guinn, EM-5

Candidate EM Sites for Use: All

Actions Required to Implement:
On April 17, 2002, EM informally requested EH-53's assistance to clarify the calculation model for the Hazard Category 3 lower threshold. EM-5 is finalizing the EM memorandum that will formalize this request.

Barriers to Implement:
1. EH-53 personnel have reiterated several times their discomfort with treating the Hazard Category 3 lower threshold as a "bright line" to distinguish between facilities which do and do not need safety basis documents. Despite the fact that the Rule and standard already define this line, this concern dampens EH-53's enthusiasm to assist in this effort.
2. The Hazard Category 3 radionuclide inventory values of DOE-STD-1027, Table A.1, were developed over ten years ago. Reproducing the exact calculation model and other considerations that defined those values may prove difficult.

Safety, Cost, and/or Schedule Benefit:
The cost to develop, review, and approve a DOE-approved final hazard categorization is estimated at 50 man-hours (approx. $5,000). The average cost to develop, review, and approve a Rule-compliant DSA is estimated to be $250,000 (see Appendix A). Per 10 CFR 830, Subpart B, all Hazard Category 1, 2, or 3 nuclear facilities require a DSA. Clarifying a repeatable means for discerning facilities that are above or below the Hazard Category 3 threshold is expected to save $245,000 for each DSA that is avoided.

Potential Idea Number: T03*

Title/Description: Issue alternate ARFs for EM-unique nuclear hazards/facilities.

Alternate ARFs were previously proposed in the draft EM limited standard SAFT-0029, "EM Facility Hazard Categorization," dated 1996. These alternate ARFs, if justified, could reduce estimated doses by factors of 10 to 100, thus reducing the number of nuclear facilities and controls. This matter is discussed in greater detail in Appendix J.

Locations Already in Use	Key References	Key Personnel
Select EM sites/facilities	DOE-STD-1027-92	Dick Englehart, EH-53
	SAFT-0029, dated May 1996	Joe Arango, EM-5
		John Wood, Oakland Operations Office

Candidate EM Sites for Use: All, especially those sites with large numbers of contaminated waste and soil sites, such as Hanford, INEEL, Nevada Test Site, Oak Ridge, and SRS

Actions Required to Implement:
1. Independent technical peer review of the five alternate ARFs proposed in SAFT-0029, and publication of their findings in a technically rigorous report.
2. Acceptance for use with DOE-STD-1027-92 by EH (see the barriers listed below).
3. Promulgation for use by an appropriate DOE authority, including specific instructions on the limits of their use.
4. Technical disposition of any prior use of the draft SAFT-0029 alternate ARFs if they are at all different than those endorsed by the technical peer review.

Barriers to Implement:
1. The alternate ARFs in SAFT-0029 must be found technically justified and defensible.
2. EM must make a policy decision regarding whether waste containers (e.g., drums) may be treated as an inherent part of the waste form. EH-53 strongly considers this to be inconsistent with the hazard categorization method described in DOE-STD-1027-92 (i.e., containers must be treated and controlled as a discrete engineered barrier).
3. As discussed in Potential Idea T02, EH-53 must still finalize a standard method/model for demonstrating how to assess a facility against the Hazard Category 3 dose criterion in DOE-STD-1027-92. Without this, alternate ARFs only support moving facilities from Hazard Category 2 to 3, not to below Hazard Category 3.

Safety, Cost, and/or Schedule Benefit:
Benefits were not specifically estimated for this item, although it is expected to:
1. Improve safety by assuring the technical validity of the draft SAFT-0029 alternate ARFs in use at some EM sites and by redirecting limited safety basis expertise from low-risk facilities to higher risk facilities.
2. Reduce costs by reducing the number of EM nuclear facilities and their attendant safety basis costs and by reducing the vulnerability to oversight/enforcement findings. Costs to prepare,

review, approve, and implement a single facility's safety basis are estimated to be between $100,000 and over $1 million, although approximately $250,000 is the typical cost.

Potential Idea Number: T04*

Title/Description: Broaden the use of performance-based TSRs and "Step-Out Criteria" for decommissioning activities.

Rocky Flats is actively decommissioning nuclear facilities 707, 771, and 776. Because the act of decommissioning eventually removes engineered safety systems (e.g., ventilation, fire sprinklers), the typical approach to TSRs of identifying specific safety systems (e.g. Fan X and Y) and controls (e.g., Fan X or Y must be running) does not work well. To accommodate this need, Rocky Flats is moving from systems-based TSRs to performance-based TSRs (e.g., minimum room to room differential pressure). As part of this process, DOE has also approved "step-out criteria" to determine when certain TSRs may be eliminated entirely without the need to come back to DOE for approval.

Locations Already in Use	Key References	Key Personnel
Rocky Flats	The Building 707 Decommissioning BIO is second generation, based on the Building 771 model. The Building 776 D-BIO will be third generation.	Ron Bostic, DOE Rocky Flats Patrice McEahren, SMI Howard Gilpin, Kaiser-Hill

Candidate EM Sites for Use: Sites with active decommissioning projects planned or underway. This is expected to include Fernald, Hanford, INEEL, Oak Ridge, and SRS.

Actions Required to Implement:
1. As was done during this EM Study, facilitate exchange meetings where the benefits and lessons of this idea can be shared with other sites.
2. Identify senior DOE and contractor management champions at sites who are not using this idea and issue them personal and/or monetary challenges to demonstrate savings. (Shirley Olinger, Richland Operations Office, is already championing the use of this idea at Hanford.)

Barriers to Implement:
1. DOE-STD-3009-94, Chapters 4 and 5, could be interpreted by some as conflicting with the performance-based TSR approach (i.e., safety systems are required to be specifically identified).
2. The contractor must be trusted to utilize the "step-out criteria" appropriately. The presence of DOE Facility Representatives serves to confirm that this is done correctly.

Safety, Cost, and/or Schedule Benefit:
Mr. Gilpin of Kaiser-Hill was the author of the Building 771 D-BIO and is now assigned to the building's operating staff required to adhere to it. While exact figures were not provided, Mr. Gilpin credits the D-BIO controls with avoiding multiple days of facility downtime, based on the flexibility and simplicity afforded to the operating staff (e.g., because specific building fans are not identified, alternate air movers can be used to meet the TSR performance criteria without the

need to process a D-BIO change). Assuming a facility crew of approximately 50, an 8-hour workday, and a fully burdened cost of $100/man-hour, the cost of a lost workday is approximately $40,000.

Potential Idea Number: T05

Title/Description: Utilize ICRP 68 versus ICRP 30 as the inhalation model for estimating doses.

ICRP 30 provides a widely recognized and accepted standard method for estimating radiation exposures by various pathways, including inhalation. DOE's occupational radiation protection Rule, 10 CFR 835, and the nuclear facility hazard categorization standard, DOE-STD-1027-92, both use values derived using ICRP 30. ICRP 68 provides a more detailed model for inhalation dose estimating. Sites that have utilized ICRP 68 have realized dose estimate reductions by factors of three to six. These reduced doses may result in designating fewer safety systems and controls, which are viewed as substantial drivers on operating cost. The use of ICRP 68 (and 72) is endorsed in an EH-53 Technical Interpretation dated August 12, 1998.

Locations Already in Use	Key References	Key Personnel
ICRP 68 has been incorporated into certain calculations at Hanford, INEEL, Rocky Flats, and SRS.	ICRP 30, 68, and 72	Maria Gavrilas-Guinn, EM-5 Patrice McEahern, SMI John Dewes, Westinghouse Savannah River Company (WSRC)
	EH-53 Technical Interpretation dated August 12, 1998	Dick Englehart, EH-53

Candidate EM Sites for Use: All, though some are already using it for specific analyses

Actions Required to Implement:
1. Facilitate sharing of the methods, benefits, and lessons learned of using ICRP 68 (and 72) among EM sites at both the DOE and contractor level.
2. Pursue with EH-53 the reasons behind their statement of April 17, 2002, noted below.

Barriers to Implement:
In the EM Study workshop on April 17, 2002, the author of the EH-53 Technical Interpretation discussed above indicated the possibility that EH-53 might withdraw this technical position. The reasons for this action are not clear to EM.

Safety, Cost, and/or Schedule Benefit:
As noted above, safety systems and their related controls are viewed as substantial drivers for operating cost. This assertion was not validated by the EM Study, although it is certainly true that designated safety systems receive more scrutiny than those which are not (e.g., DOE actions stemming from DNFSB Recommendation 2000-2). Irrespective of the cost savings, dose modeling that more accurately reflects risk is viewed as beneficial in that attention and resources are more likely to be distributed appropriate to the risks.

Potential Idea Number: T06*

Title/Description: Standardize accident analysis methods by completion and issuance of the draft "DOE Accident Analysis Handbook."

In 1999, Mr. Dae Chung, NNSA, initiated a project to prepare a DOE Accident Analysis Handbook. The work (latest draft dated April 2002) is now approximately 90% complete, but NNSA management interest has waned. Issuance of the handbook is expected to improve complex-wide consistency in accident analysis and facilitate development of standardized, site-specific safety analysis manuals and processes. Accident analysis is judged by experienced safety analysts as a major cost component of developing safety basis documents (i.e., this is where most of the intellectual effort of safety analysis is invested). Variability in accident analysis methods between sites and facilities, among different safety analysts, and between DOE reviewers adds significantly to review and approval times. Mr. Chung estimates that another $100,000 is required to complete and publish the handbook.

Locations Already in Use	Key References	Key Personnel
N/A	Draft "DOE Accident Analysis Handbook," dated April 2002	Dae Chung, NNSA
		Sandra Johnson, EM-5

Candidate EM Sites for Use: All, but especially for long-term mission sites committed to developing standardized accident analysis methods

Actions Required to Implement:
1. EM could provide $100,000 in funding to complete the handbook. (Note: This action was completed as part of the EM Study.)
2. Mr. Chung, NNSA, will lead the completion and publication of the handbook.
3. EM will establish mechanisms, such as was done during the EM Study, to facilitate awareness and use of the handbook.

Barriers to Implement:
The DOE standards development, review, and issuance process requires administrative effort to complete. While the sites may benefit from the handbook's contents even in draft form, formal DOE issuance of this handbook will permit all users to view its contents as sanctioned and acceptable for use.

Safety, Cost, and/or Schedule Benefit:
As identified in Appendix A, the cost to prepare, review, and approve a nuclear facility safety basis ranges from $100,000 to over $1 million. Simple facilities (i.e., those with safety bases at the low end of the cost scale) do not typically require detailed accident analysis. For complex and hazardous nuclear facilities, safety analyses typically include an accident analysis. As a major cost component, accident analysis alone can cost $100,000 (roughly 0.5 man-years of an analyst's effort) and up. The cost to EM to assist in completing the handbook should be recovered in lower safety basis costs in only a few iterations of use.

Potential Idea Number: T07*

Title/Description: Standardize site-specific accident analysis methods by developing site-specific analysis handbooks.

Since 1997, the Rocky Flats operating contractor has developed and refined a *Safety Analysis and Risk Assessment Handbook* (SARAH, currently Revision 3 is dated December 24, 2001). The handbook is intended to aid nuclear safety analysts in producing consistent and technically sound safety analyses and risk assessments for facilities at Rocky Flats. It describes the methodology for safety analysis and risk assessment, and it provides a common set of data for the analysts to ensure consistency in approach. It is intended to be a "how to" guide and a reference source for information needed for such work. The Richland Operations Office is pursuing creation of a comparable manual for Hanford.

Accident analysis is judged by experienced safety analysts as a major cost component of developing safety basis documents (i.e., this is where most of the intellectual effort of safety analysis is invested). Variability in accident analysis methods between sites and facilities, among different safety analysts, and between DOE reviewers adds significantly to review and approval times.

Locations Already in Use	Key References	Key Personnel
Rocky Flats	Kaiser-Hill SARAH (RFP-5098, Revision 3, dated December 24, 2001)	Ron Bostic, DOE Rocky Flats Patrice McEahern, SMI
Hanford	Draft Fluor Hanford SARAH (HNF-8739)	Shirley Olinger, Richland Operations Office Al Ramble, Fluor Hanford
INEEL	BBWI *Method Guide*	Jerry Paulson, BBWI

Candidate EM Sites for Use: All, but especially for long-term mission sites committed to developing standardized accident analysis methods

Actions Required to Implement:

1. EM will establish mechanisms, such as was done during the EM Study, to facilitate awareness and duplication of the Rocky Flats SARAH at other EM sites.
2. The Hanford effort will broaden the applicability of the SARAH (i.e., Rocky Flats is primarily concerned with weapons-gradé Plutonium). Once the Hanford SARAH is developed, there will be actual data regarding the cost and effort required to create it, which can be used to judge the benefit of undertaking SARAH efforts at other EM sites.
3. Once the DOE "Accident Analysis Handbook" of Potential Idea T06 is issued, evaluate what streamlining of the SARAH can be done by citing the DOE Handbook.

Barriers to Implement:

1. Some safety analysts resent or are suspicious of what they view as a "cookie cutter" approach to safety analysis. By contrast, those familiar with the SARAH view it as liberating them

from developing and defending the more routine aspects of safety analysis and allowing them to spend more time on the more complex and difficult portions of analysis.

2. The Rocky Flats SARAH cannot be simply copied for another site's use. Site-specific elements of the SARAH (e.g., site boundary look-up tables, meteorology, radionuclides of interest) must be tailored for each site. This conversion effort is actually a valuable part of the process of making the new site familiar with the content of the SARAH.

Safety, Cost, and/or Schedule Benefit:
Similar to the discussion in Potential Idea T06, the cost of this effort is expected to be recovered via lower safety basis costs in only a few iterations of use.

Potential Idea Number: T08*

Title/Description: Automate standardized, site-specific accident analysis by developing site-specific computer tools.

As discussed in Potential Ideas T06 and T07, the facilitation of standardized accident analysis methods can result in significant cost savings. In concert with the SARAH effort discussed in T07, Rocky Flats also created a site-specific RADIDOSE computer tool for consequence calculation. This tool, based on a Microsoft Excel spreadsheet program, allows the user to evaluate a variety of different accident release scenarios at different durations, distances, source terms, etc., as well as inadvertent criticality. RADIDOSE already includes the dose calculation benefits of using ICRP 68 (see Potential Idea T05).

Locations Already in Use	Key References	Key Personnel
Rocky Flats	RADIDOSE computer spreadsheet program, Version 1.4.3, dated December 2001	Ron Bostic, DOE Rocky Flats Patrice McEahern, SMI Dr. Vern Peterson, retired
Hanford	A Hanford-specific version of RADIDOSE is planned as part of the SARAH effort discussed in Potential Idea T07	Shirley Olinger, Richland Operations Office Al Ramble, Fluor Hanford
INEEL	RSAC-6 Computer Code	Norm Cole, BBWI
	Safety basis software quality assurance expertise	Dae Chung, NNSA

Candidate EM Sites for Use: All, but it is strongly dependent upon obtaining site-level agreement on standard methods for performing accident analysis as discussed in Potential Idea T07

Actions Required to Implement:

1. EM will establish mechanisms, such as was done during the EM Study, to facilitate awareness and duplication of RADIDOSE at other EM sites.
2. The Hanford effort will broaden the applicability of RADIDOSE (i.e., Rocky Flats is primarily concerned with weapons-grade Plutonium). Once the Hanford model is developed, there will be actual data regarding the cost and effort required to create a Hanford RADIDOSE, which can be used to judge the benefit of undertaking similar efforts at other EM sites.
3. Once the DOE "Accident Analysis Handbook" of Potential Idea T06 is issued, evaluate what additional changes to RADIDOSE should be made.

Barriers to Implement:

1. The same barriers exist here as those listed for Potential Idea T07.
2. Use of the computer tool requires specialized training as to its appropriate uses and limitations. The code also requires periodic quality validation to assure its accuracy.

Safety, Cost, and/or Schedule Benefit:
The rough-order-of-magnitude estimate to amend RADIDOSE for Hanford's use is $100,000. As discussed in Potential Idea T06, the cost of this effort is expected to be recovered in lower safety basis development costs. Safety will also be enhanced as calculation errors are reduced and analysts are liberated from routine calculations to pursue more complex technical issues.

Potential Idea Number: T09*

Title/Description: Develop site-wide, generic safety basis documents.

As discussed in DNFSB/TECH-28, Section 2.2, several EM sites have determined that it is more cost-effective to document the common sections of SARs for several facilities located at the same site in a generic document. These "generic SARs" typically cover Chapters 1 and 6-17 as defined in DOE-STD-3009-94, although the exact chapters covered varies from site to site. "Generic SARs" are typically referenced with little to no additional explanation in facility-specific SARs.

Of the several "generic SAR" examples reviewed during the EM Study, the BBWI SAR-100 at INEEL appeared the most efficient in its coverage. BBWI has also developed a generic set of TSRs that address the definitions and administrative controls typically found in most facility TSRs. This permits the facility-specific TSR set to focus on controls unique to the facility.

Locations Already in Use	Key References	Key Personnel
INEEL	SAR-100, Revision 0, and TSR-100, Draft 0, dated February 2002	Jerry Paulson, BBWI Tom Wichmann, Idaho Operations Office
SRS	SRS Generic SAR (G-SAR-G-00001, Revision 4, dated September 1999)	Jeff Harvey, WSMS Mosi Dayani, Savannah River Operations Office

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Provide opportunities for sites to discuss and share examples, benefits, and lessons learned with regard to generic safety basis documents.
2. Advocate and/or incentivize contractors who use or adopt generic safety basis documents.

Barriers to Implement:
1. For sites that possess multiple prime contractors (e.g., Hanford) or make extensive use of subcontractors through management and integration contracts (e.g., Oak Ridge), it may not be possible to prepare certain chapters of a "generic SAR."
2. Some sites approach this idea by preparing the generic chapters and then importing them into each facility-specific SAR. While this does provide a short-term efficiency, maintaining fidelity amongst multiple facility SAR programmatic chapters will quickly become a major challenge. This method of developing generic programmatic chapters is not preferred.

Safety, Cost, and/or Schedule Benefit:
Thirteen of the seventeen chapters of a SAR address topics that are largely generic to the site. Reproducing these chapters in each facility-specific SAR is inefficient and dilutes attention from the facility-specific features addressed in the facility SAR. Safety is enhanced if the facility SAR can be made less verbose and overwhelming. If users can quickly identify relevant information and not get lost amongst the generic verbiage, they will be more inclined to use it.

Potential Idea Number: T10

Title/Description: Develop site-wide, waste management safety basis documents.

Waste management activities and facilities share much in common. As a result, all of the sites visited during the EM Study have prepared site-wide, waste management safety basis documents. Aside from the efficiencies offered by addressing multiple facilities in one safety basis document, this approach permits more efficient use of personnel that need not be retrained when moving from facility to facility. The controls in one waste management building (e.g., drum spacing limits) are the same in every other waste management building. As a result, even certain waste management procedures can be standardized for use at all facilities.

Locations Already in Use	Key References	Key Personnel
Hanford		Al Ramble, Fluor Hanford
INEEL		Jerry Paulson, BBWI
Oak Ridge		Bruce Wilson, Bechtel Jacobs Company LLC
Rocky Flats		Patrice McEahern, SMI
SRS		Andrew Vincent, WSRC

Candidate EM Sites for Use: Any who don't do so already

Actions Required to Implement:
1. Identify sites that are not currently addressing waste management facilities in overarching safety basis documents and put them in contact with expertise at sites that already do so.
2. Provide incentives for having sites adopt this practice if they have not already done so.

Barriers to Implement:
The waste management facilities covered under the overarching safety basis must be compatible in the specifics. For some sites, it may be more appropriate to have several safety bases (e.g., waste drum operations versus hazardous chemical incinerator operations).

Safety, Cost, and/or Schedule Benefit:
Safety and cost data was not collected to dramatize the benefit of this idea, but they appear obvious. Safety, in particular, is enhanced when the number of facility-unique safety features are minimized for operators who must work in multiple facilities.

Potential Idea Number: T11

Title/Description: Develop complex-wide, generic DSAs for broad EM mission areas.

In December 2001, NRC Regional Administrator Luis Reyes prepared a draft report for DOE entitled "Opportunities for Improvement, A Review of Safety Management at the Department of Energy." That draft report recommended that DOE "develop guidance documents or acceptable interpretations of requirements for broad missions, e.g., authorization basis for waste storage on concrete pads or preventive maintenance at short-lived facilities." The EM 10 CFR 830, Subpart B, Implementation Study was mindful of this recommendation.

The EM Study attempted to develop EM-wide guidance in Potential Ideas P01, T01, T03, and T06. The study identified several examples where generic approaches are being used at a site level and encouraged the sharing of these ideas between sites (see Potential Ideas T04, T07, T08, T09, T10, A01, and A02). However, the study also attempted to identify potential EM missions or facilities that are suitable for treatment in an EM-wide, generic safety analysis. (NRC does this type of licensing in 10 CFR 30 through the 20-volume set of NUREG-1556. Generic NRC safety analyses such as those in NUREG-1717 and NUREG/CR-6642 support a prescriptive, but limited, set of safety controls for specific types of licensees.) Aside from Potential Idea T01, the most promising example of a generic safety analysis that may support use EM-wide is the long-term surveillance and maintenance DSA planned for development at Hanford. Other activities or facilities potentially suitable for generic, EM-wide coverage may include waste management, decommissioning of a particular class of facilities (e.g., Plutonium processing), and burial site remediation.

Locations Already in Use	Key References	Key Personnel
None	Still to be developed	Shirley Olinger, Richland Operations Office Al Ramble, Fluor Hanford

Candidate EM Sites for Use: All

Actions Required to Implement:

1. Permit Hanford to complete preparation of the long-term surveillance and maintenance DSA.
2. Evaluate what site-specific features of the Hanford DSA would require amendment to permit using it for long-term surveillance and maintenance at facilities EM-wide.
3. Develop and issue an EM-wide, generic surveillance and maintenance DSA.

Barriers to Implement:

1. EM-wide, generic DSAs must address the most limiting features at all EM sites. Collecting this catalog of information is time consuming and tedious.
2. DOE needs to specifically address business-driven controls that NRC can implicitly credit in its regulations (e.g., insurance companies will demand adequate fire protection to prevent possible loss). Since DOE is the owner, operator, and insurer, as well as the regulator, DOE's considerations are necessarily more encompassing.
3. As discussed in Potential Idea T01, generic safety basis documents evoke concern from safety oversight personnel due to the large number of potentially involved facilities. Due to

the perceived large uncertainties in the conditions to which it will be imposed (see Barrier 1), there will be a tendency to apply extra conservatism to the analysis and controls to assure that safety is adequately protected.

Safety, Cost, and/or Schedule Benefit:
Aside from the experience of developing Potential Idea T01, the EM Study developed no data to estimate the cost versus benefit of this effort. Whereas T01 is not yet complete, it is premature to judge its success and, therefore, its cost benefit.

Potential Idea Number: T12

Title/Description: Establish screening criteria for defining "common industrial hazards" for hazards analysis.

This action is suggested in Table 2 of the draft DOE Handbook SAFT-0085, "Integration of Multiple Hazard Analysis Requirements and Activities," dated April 2002. DOE-STD-3009-94, Chapter 3, states "It is not the intent of the Safety Analysis Report to cover safety as it relates to the common industrial hazards . . ." Unfortunately, defining exactly what constitutes such hazards is an area for confusion and inconsistent application.

Locations Already in Use	Key References	Key Personnel
Each site has developed its own approach	Draft DOE Handbook SAFT-0085, "Integration of Multiple Hazard Analysis Requirements and Activities," dated April 2002	Bill McArthur, EH-52 David Pegram, EH-52 Jeff Woody, Link Technologies, Inc.

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Convene a DOE working group between EH and DOE line management to address this question. Alternatively, request the EFCOG SAWG to develop a consensus document that the DOE could evaluate.
2. Utilizing Table 2 of the draft DOE Handbook as a starting point, compile a list of threshold values for materials that constitute common industrial hazards.
3. Promulgate the subject list for use complex-wide by a suitable DOE authority.

Barriers to Implement:
1. The apprehensiveness of EH-53 to commit to explicit dose evaluation guidelines (see Potential Idea P11) would likewise be expected to apply here. Committing to explicit values of any kind for safety analysis purposes reduces flexibility and creates a concern that the analysis of valid hazards could be overlooked or avoided.
2. Certain sites may be required to rework existing analyses if their prior threshold for common industrial hazards was set higher than the standardized criteria.

Safety, Cost, and/or Schedule Benefit:
Benefits were not specifically estimated for this item, although it is expected to:
1. Improve safety by assuring consistent treatment of common industrial hazards.
2. Reduce costs by eliminating the necessity to review and debate every individual facility's determination of what constitutes common industrial hazards.

Potential Idea Number: A01*

Title/Description: Flowchart the safety basis development, review, and approval process to identify efficiency opportunities.

The safety basis development, review, and approval process can be extremely protracted and lengthy, very often taking over a year to complete. As part of the Bechtel corporate Six Sigma initiative, BBWI and Bechtel Jacobs Company LLC flowcharted this process to identify efficiency opportunities, facilitate planning, integrate safety analyses requirements, and train personnel. BBWI's reengineered process is expected to shorten the duration of the process by one-third and reduce costs by 20% (not including DOE costs and duration). Bechtel Jacobs Company LLC credits their effort with obtaining DOE's agreement on the required points in the process for DOE review and approval.

Locations Already in Use	Key References	Key Personnel
INEEL		Norm Cole, BBWI
Oak Ridge		Bruce Wilson, Bechtel Jacobs Company LLC

Candidate EM Sites for Use: All, though each site will need to tailor the review to its own organization

Actions Required to Implement:
1. As was done during this EM Study, facilitate exchange meetings where the benefits and lessons of these efforts can be shared with other sites.
2. Identify senior DOE and contractor management champions at sites who have not performed this self-assessment and issue them personal and/or monetary challenges to demonstrate comparable savings.

Barriers to Implement:
In streamlining the safety basis process, DOE must balance the benefits of early and regular involvement with the need to retain sufficient independence to judge the resulting product.

Safety, Cost, and/or Schedule Benefit:
1. The Bechtel flowcharts visually demonstrate the inefficiencies that result from lack of early and regular involvement by operations, safety, and support organization staff. Obtaining their understanding and commitment to being involved results in higher quality safety analysis, better controls, and technically correct documents. This enhances safety.
2. As discussed above, BBWI estimates cost savings of 20%. Based on calendar year 2000 results, the average cost of producing a safety basis document (not including DOE's cost) was $266,000 and would be expected to be reduced by $53,000.
3. As discussed above, BBWI estimates schedule savings of one third. Based on the BBWI flowchart, the "old" process took approximately 365 days to complete, whereas the "new" process is expected to be completed in 243 days.

Potential Idea Number: A02

Title/Description: Utilize an "authorization basis list" to manage applicability of multifacility safety bases.

For efficiency purposes, most sites write their safety basis documents to cover multiple similar facilities/activities (e.g., waste drum storage). In some instances, facilities need to be added or removed from these safety basis documents (e.g., a waste drum storage building is emptied and demolished). Rather than process a page change to the safety basis document itself, some sites have chosen to manage this through use of an official authorization basis list. The authorization basis list identifies not only the facilities to which each safety basis applies but also provides a single authoritative source for identifying which documents constitute the authorization basis. (The authorization basis includes more than just the safety basis.) A web-based authorization basis list allows for a much more efficient and timely change control process than processing page changes to safety basis documents.

Locations Already in Use	Key References	Key Personnel
SRS	SAFETYNET web site	Andrew Vincent, WSRC April Price, WSMS
INEEL		Jerry Paulson, BBWI
Oak Ridge		John Lyons, Bechtel Jacobs Company LLC

Candidate EM Sites for Use: All, except those where it is already in use

Actions Required to Implement:
1. Request sites to self-identify whether they utilize the authorization basis list concept.
2. Identify sites that would benefit from using the authorization basis list concept and experts at sites that already use an authorization basis list. Facilitate their working together. This might also include creating some minimum EM standard for authorization basis list format and content.
3. Provide incentives for sites to adopt and implement the authorization basis list concept.

Barriers to Implement:
1. The authorization basis list must be maintained under rigorous change control by a trusted agent. Some DOE offices (e.g., the NNSA Y-12 Area Office) insisted on maintaining the authorization basis list themselves, based on concerns about unauthorized changes.
2. To achieve the maximum benefit, the authorization basis list must be easily and quickly updated. Paper-based authorization basis lists and/or web-based authorization basis lists that are sluggishly updated will become out of date and will not be trusted by users. Some of the safety basis difficulties experienced in the second half of 2001 in Oak Ridge were directly tied to an out-of-date and incomplete authorization basis list.

Safety, Cost, and/or Schedule Benefit:
1. Safety compliance, management, and oversight are simplified by use of a web-based, current authorization basis list that improves their reliability and focus.

2. Administrative updates to safety basis documents can often become major efforts if the involved parties (DOE or contractor) get sidetracked into making nonessential "enhancements" to the documents. As a result, simple changes can evolve into multiple man-month efforts. The authorization basis list avoids creating some of these situations.

Potential Idea Number: A03

Title/Description: Utilize 10 CFR 830-derived checklists for safety basis completeness reviews.

Due to its regulatory nature, the implementation of and compliance with 10 CFR 830, Subpart B, is receiving more exacting attention to detail than may have been afforded to the predecessor DOE Orders. Some sites have adopted checklist tools to assist both DOE and contractor personnel in assessing compliance. Since these tools are not site-specific, sharing them with other sites can be easily done and avoids the need for the other sites to create similar tools.

Locations Already in Use	Key References	Key Personnel
Hanford	The *Gap Analysis* explicitly examines each element of Subpart B.	John Harris, CH2M Hill Hanford Group, Inc. Bob Nelson, Richland Operations Office
INEEL	The *Quality Checklist* addresses the six required elements defined in 10 CFR 830.204.(b).	Norm Cole, BBWI Tom Wichmann, Idaho Operations Office

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Post blank templates of these tools or the contact information to obtain them on the EM safety basis web page.
2. Add other tools to the web page as provided by other sites.

Barriers to Implement:
None.

Safety, Cost, and/or Schedule Benefit:
Assuring that all EM sites have access to and utilize a technically sound compliance checklist should improve both safety and cost effectiveness.

Potential Idea Number: A04*

Title/Description: Develop an EM Headquarters safety basis web page.

EM-1 has in the past, recently, and in the future will issue direction to DOE sites regarding safety basis expectations and guidance. Much of this guidance has a very short practical lifespan, unless it is incorporated in formal guidance elsewhere (such as a DOE Order). Lack of a central repository for EM safety basis guidance makes it difficult for DOE staff and contractors to easily recall and determine which EM-1 guidance is still relevant. An EM web page for EM-1's safety basis-related guidance will alleviate some of this concern.

Locations Already in Use	Key References	Key Personnel
EM Headquarters already has a working web site.		Maria Gavrilas-Guinn, EM-5 Mike Kleinrock, EM-7.1

Candidate EM Sites for Use: EM Headquarters, for use by all EM sites

Actions Required to Implement:
1. Identify and compile the collection of documents to be placed on the web site. (Note: EM-5 has this action underway.)
2. Create the web page, layout, and access protocols for use by all EM sites. (Note: EM-7 has this action underway.)
3. Assign EM leads for both technical content and computer system administration.

Barriers to Implement:
Security concerns and development of related access protocols.

Safety, Cost, and/or Schedule Benefit:
The incremental cost to add this web page to an existing EM web site should be minimal. The study author spent several hours attempting to identify and acquire some of the references that will be posted. If this exercise is repeated at every EM site, the lost productivity cost could well exceed the cost of web page maintenance.

Potential Idea Number: A05

Title/Description: Establish a collection of EM-endorsed, final hazard categorization examples for use at other sites.

As discussed in Potential Idea T02, the method to demonstrate that a facility can be categorized as below Hazard Category 3 is not readily apparent to many in the field. Some contractors have successfully articulated facility recategorization arguments that their local DOE sites have approved (e.g., SRS R-Reactor). A central repository of hazard categorization examples was identified by EM contractors as something that would be very useful. The EM web site discussed in Potential Idea A04 would appear to be a logical place for this information to be posted.

Locations Already in Use	Key References	Key Personnel
		Maria Gavrilas-Guinn, EM-5

Candidate EM Sites for Use: EM Headquarters, for use by all EM sites

Actions Required to Implement:
1. Identify hazard categorization examples from EM sites for sharing EM-wide.
2. Review the examples for technical completeness and adequacy. Once determined to be technically sound, identify which specific items to post on the web page.
3. Post the identified examples on the web page.
4. Identify an EM person responsible for updating the web page as needed.

Barriers to Implement:
1. Examples posted by EM Headquarters will take on additional significance, since they will be viewed as "endorsed" for EM-wide use. The entries must therefore receive additional technical scrutiny to assure they are fully compliant with 10 CFR 830 and DOE-STD-1027-92.
2. Based on item 1 above, sites who volunteer their examples are vulnerable to having their local DOE offices challenged or reversed by a higher authority in Headquarters.

Safety, Cost, and/or Schedule Benefit:
The cost to develop, review, and approve a DOE-approved final hazard categorization is estimated at 50 man-hours (approximately $5,000). The cost to develop, review, and approve a safety basis is estimated at $100,000 and up. Many of the EM sites have a collection of similar facilities.
1. If a technically sound hazard categorization example can be efficiently shared with another EM site, the cost savings per facility could range from $5,000 to $100,000 and higher.
2. If technically sound examples are shared and duplicated elsewhere, safety will be enhanced.

Potential Idea Number: A06

Title/Description: Utilize an integrated hazard analysis team and process to maximize consistency and efficiency.

As also discussed in Potential Idea A09, there are a host of Rules and regulations that require the performance of hazard analysis. Efficiently integrating these various requirements presents a significant challenge. The subject of inadequately integrated hazard analysis has been the subject of recent findings by the DNFSB and correspondence with DOE. As suggested by the draft DOE Handbook SAFT-0085, "Integration of Multiple Hazard Analysis Requirements and Activities," dated April 2002, multidisciplinary teams (e.g., operations, safety analysis, fire protection, emergency planning, industrial hygiene, radiological controls) provide an excellent mechanism to integrate these hazard analysis activities. While all EM sites visited claim to utilize this process, all also complained about the difficulty of getting the committed involvement of key members (often citing management, operations, or DOE).

Locations Already in Use	Key References	Key Personnel
	Draft DOE Handbook SAFT-0085, "Integration of Multiple Hazard Analysis Requirements and Activities," dated April 2002	Bill McArthur, EH-52 David Pegram, EH-52 Jeff Woody, Link Technologies, Inc.
SRS	WSRC *Consolidated Hazard Analysis Process* (hazard analysis and control selection together). WSRC SCD-11 procedure, Section 3, Revision 0, dated January 21, 2002	George Clare, WSRC W. Joe Copeland, WSMS

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Identify tools, such as those mentioned in Potential Idea A01, which dramatize the safety, cost, and schedule impacts of failing to utilize an integrated hazard analysis approach.
2. Identify and advocate source documents that demonstrate how hazard analysis can be effectively integrated. Sponsor workshops to share expertise and lessons learned.
3. Provide incentives for the adoption and use of the advocated techniques.

Barriers to Implement:
1. Some of the methods, tools, and techniques for performing integrated hazard analysis are viewed as providing a competitive advantage by those who use them. In most instances, these tools were developed with DOE funds and are available for sharing if DOE demands it.
2. Hazard analysis processes are not just a collection of unrelated pieces that can be mixed and matched. Adopting some of these methods may involve substantially more effort than just assembling the appropriate multidisciplinary team.

Safety, Cost, and/or Schedule Benefit:
The same as described in Potential Idea A01.

Potential Idea Number: A07

Title/Description: Develop and verify management's and DOE's expectations early in the safety basis development process.

During the EM Study site visits, anecdotal examples were provided of instances where proposed safety basis documents, and the controls they prescribed, were not well received by management and/or DOE. This conflict was attributed to the failure to obtain the up-front understanding and expectations of management and DOE. Several sites have addressed this concern in various ways, but they are each attempting to establish management expectations, scope (e.g., which buildings will the safety basis cover?), roles and responsibilities (e.g., who has the final say on control selection?), strategy (e.g., how does this safety basis complement the facility's future mission?), and methods to be used early in the safety basis development process.

Locations Already in Use	Key References	Key Personnel
SRS	WSRC "Safety Basis Strategy" (WSRC 11Q *Facility Safety Document Manual*, Procedure 1.10, Revision 0, dated January 31, 2002	Andrew Vincent, WSRC
INEEL	See Potential Idea A01	Norm Cole, BBWI
Oak Ridge	BJC "Task Plan" concept	John Lyons, Bechtel Jacobs Company LLC

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Identify tools, such as those mentioned in Potential Idea A01, that dramatize the safety, cost, and schedule impacts of failing to identify expectations early on.
2. Identify and advocate source documents that demonstrate how expectations can be defined up-front. Sponsor workshops to share expertise and lessons learned.
3. Provide incentives for the adoption and use of the advocated techniques.

Barriers to Implement:
1. Resistance by those in positions of authority who believe that such an administrative process is unnecessary because "everyone knows" their expectations.
2. Resistance by those in positions of authority who believe that formally defining their expectations early on will constrain their ability to deal with new information or later changes of mind. Closely related to this is the suspicion of losing independence.

Safety, Cost, and/or Schedule Benefit:
Users did not provide specific estimates of the benefits of this idea, although it is expected to improve safety, cost, and schedule by reducing the amount of fundamental debate late in the process. Fundamental changes in direction (e.g., including additional buildings, developing a different safety control approach) can have major impacts on the safety basis and the analyses that support it.

Potential Idea Number: A08

Title/Description: Utilize DOE and/or contractor committees to address site-level safety basis policy, technical judgement, and consistency issues.

As discussed throughout this EM 10 CFR 830, Subpart B, Implementation Study report, there are a large number of areas where the existing DOE Rules, Orders, and standards either provide significant latitude or do not address certain details. This creates the need for local decisions and guidance to establish site-level direction on whether and how each of these areas is to be consistently addressed (e.g., will all facilities and contractors on site use the same evaluation guidelines?). Some site contractors have established formal committees or working groups (some jointly with DOE and others standalone) to address these areas of uncertainty. Some of these groups also address the identification of DOE's and management's expectations discussed in Potential Idea A07.

Locations Already in Use	Key References	Key Personnel
Hanford Tank Farms	DOE/CH2M Hill Hanford Group, Inc., Nuclear Safety Rule Working Group	Brad Smith and John Harris, CH2M Hill Hanford Group, Inc.
SRS	DOE/WSRC Authorization Basis Steering Committee	George Clare, WSRC
Oak Ridge	DOE/Bechtel Jacobs Company LLC Safety Basis Review Board	Jay Mullis, Oak Ridge Operations Office John Lyons, Bechtel Jacobs Company LLC
SRS	Conservatism Review Committee, a senior group that advises analysts on selection of "reasonably conservative" methods	Mike Hitchler, WSMS Don Paddleford, WSRC

Candidate EM Sites for Use: All

Actions Required to Implement:

1. Identify testimonials and evidence that dramatize the safety, cost, and schedule value of specific types of site-level working groups.
2. Identify and advocate source documents that demonstrate how such groups are established and chartered. Sponsor workshops to share expertise and lessons learned.
3. In concert with identified working groups, identify and address areas of common concern amenable to solution at an EM Headquarters level. (The EM-1 guidance memorandum described in Potential Idea P01 is an example of one way to do this.)

Barriers to Implement:

1. Resistance by those in positions of authority who believe these groups are unnecessary. (Interestingly, SRS has a long tradition of using such groups and, to date, has not found issues sufficiently lacking as to disband them.)
2. Resistance by those in authority positions who believe that these groups constrain their freedom of action or negatively influence their technical independence.

Safety, Cost, and/or Schedule Benefit:
Users did not provide specific estimates of the benefits of this idea, although it is expected to improve safety, cost, and schedule by reducing uncertainty and late-identified major changes to proposed safety basis documents.

Potential Idea Number: A09

Title/Description: Publish the draft DOE Handbook SAFT-0085, "Integration of Multiple Hazard Analysis Requirements and Activities," dated April 2002.

There are a host of Rules and regulations that require the performance of hazard analysis. Efficiently integrating these various requirements, let alone just understanding and being aware of them all, presents a significant challenge. During fiscal year 2001, the DOE Chemical Safety Topical Committee (EH-52 lead) formed a team to evaluate possible methods for integrating chemical hazard analysis activities with radiological, emergency preparedness, environmental, and other potentially overlapping hazard analysis activities. Their collective insight is captured in the subject draft handbook and provides extremely valuable insights and considerations for contractors to efficiently integrate these various requirements.

Locations Already in Use	Key References	Key Personnel
Each site has developed its own approach.	Draft DOE Handbook SAFT-0085, "Integration of Multiple Hazard Analysis Requirements and Activities," dated April 2002	Bill McArthur, EH-52 David Pegram, EH-52 Jeff Woody, Link Technologies, Inc.

Candidate EM Sites for Use: All

Actions Required to Implement:
EH-52 has the lead for this action.

Barriers to Implement:
None known.

Safety, Cost, and/or Schedule Benefit:
1. More fully integrated hazard analysis results in more logical controls being established and passed down to the worker. Logically layered and integrated controls are easier for workers to recall and adhere to than those which redundantly, but incompletely, address the same hazard.
2. The EH-52 product represents many man-months of effort that could have been reproduced by every EM contractor.
3. The subject of inadequately integrated hazard analysis has been the subject of recent findings by the DNFSB and correspondence with DOE. Effective use of this handbook may avoid future such interactions that can demand significant DOE and contractor senior management attention to address.

Potential Idea Number: A10

Title/Description: Request EM sites to self-evaluate their safety basis practices for efficiencies.

There are several DOE standards and references that identify opportunities for efficiencies or caution against wasteful and unneeded practices (e.g., DOE G 424.1-1, Appendix B). Without a line management driver, these good practices can be overlooked or disregarded, since they do not typically represent "requirements" demanding formal contractor response. A deliberate effort by EM to have its sites self-evaluate their work practices may reveal safety-enhancing and cost-saving opportunities.

Locations Already in Use	Key References	Key Personnel
N/A	DOE G 424.1-1, Appendix B	Sandra Johnson, EM-5
	Draft DOE Handbook SAFT-0085, "Integration of Multiple Hazard Analysis Requirements and Activities," dated April 2002 (discussed in Potential Idea A09)	
	Many of the other Potential Ideas listed in this Appendix.	

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Identify an EM lead for this effort. (EM-5 would seem a logical starting point.)
2. Identify a list of good practices to be assessed against.
3. Task each EM site to conduct a self-assessment as to whether they employ these good practices. In parallel, identify subject matter experts for each (or multiple) good practice.
4. Have the team of EM subject matter experts visit each site to evaluate the self-assessment and provide assistance with how to implement corrective actions based on the findings.

Barriers to Implement:
The results must clearly only be used to assist the field. Any attempt to use the review findings to punish the site or create major reporting requirements would be counterproductive.

Safety, Cost, and/or Schedule Benefit:
If this review were incorporated as an element of the required annual site Integrated Safety Management self-assessment, the incremental cost to perform this review should be minimal. Many of these good practices can clearly be linked to being part of a sound Integrated Safety Management program.

Potential Idea Number: A11*

Title/Description: Formalize the quality assurance process for the generation of EFCOG documents.

Please see Appendix K to this EM 10 CFR 830, Subpart B, Implementation Study for a complete discussion of this matter.

Locations Already in Use	Key References	Key Personnel
	Appendix K	John Longenecker, EFCOG Administrative Director Frank Figueroa, EFCOG Chair

Candidate EM Sites for Use: N/A

Actions Required to Implement:

1. EFCOG to develop and adopt quality control processes for EFCOG working group products. (Note: As of mid-May 2002, a preliminary set of requirements had been prepared for consideration by the EFCOG Directors. The processes used by ASME are also being evaluated for possible use.)
2. Upon issuance, disseminate these criteria to the EFCOG working groups and DOE customers, along with the expectations and means to assure use and adherence.

Barriers to Implement:

The DOE concerns at the root of this action have existed for some time but were not successfully advanced with the EFCOG until this EM Study. There may be other DOE concerns that color the perception of the EFCOG's products which may need to be flushed out. Advancing the EFCOG quality control process should hopefully do this.

Safety, Cost, and/or Schedule Benefit:

DOE already pays for the EFCOG. The level of benefit received by DOE appears to simply be a function of DOE's demands and expectations of the EFCOG.

Potential Idea Number: A12

Title/Description: Request the EFCOG SAWG to address complex-wide issues that influence EM costs and schedules.

As a collection of contractor safety basis experts from around the DOE complex, the EFCOG SAWG appears ideally suited to address complex-wide issues that influence EM costs and schedules. A test case with the EFCOG SAWG regarding the USQ definition of "accidents of a different type" was conducted in March 2001 as part of this EM Study. While the specific product met with mixed results, the test clearly demonstrated the EFCOG's ability to produce timely, focused products on matters of DOE line management interest. The key issue appears to be identifying a DOE customer with a particular need and interest in having the EFCOG address the matter. Appendix K to this EM Study discusses in greater detail the concerns with utilizing the EFCOG.

Locations Already in Use	Key References	Key Personnel
All EM contractors are members of the EFCOG	Information about the EFCOG is available at: http://www.efcog.org/	Jerry Hansen, WSMS and Tammy Hobbes, BBWI, EFCOG SAWG Co-Chairs John Longenecker, EFCOG Administrative Director

Candidate EM Sites for Use: All

Actions Required to Implement:

1. Identification of specific EM safety basis issues in need of clarification or suggested methods of resolution. (This subject itself might merit asking the EFCOG SAWG for their collective opinion as to what safety basis matters are most in need of redress.)
2. Develop a prioritized list and schedule for the EFCOG to address these matters. Depending upon their urgency or crosscutting nature, DOE Headquarters leadership may be needed to direct that appropriate contractor priority and resources be assigned to addressing these matters.
3. Develop mechanisms whereby EFCOG positions can be reviewed and considered for DOE-EM or DOE-wide guidance.

Barriers to Implement:

1. The Federal Advisory Committee Act (5 United States Code, Appendix 2) places constraints on how the government can solicit for advice on regulatory matters. Any working relation with the EFCOG will need to be attentive of the limitations imposed by the Federal Advisory Committee Act.
2. DOE's concerns with quality control and use of EFCOG SAWG products, as discussed in potential idea A11 and Appendix K, will need to be addressed.
3. For the last several years, EH has been the most active DOE participant with the EFCOG SAWG. For DOE line management concerns to be given equal importance with the EFCOG, DOE line management representatives (e.g., EM) must become actively engaged.

4. Unlike commercial nuclear industry funded groups (e.g., the Nuclear Energy Institute), the EFCOG is funded by DOE, and its profit motive is less compelling. As a result, EFCOG members are not as aggressive in pressing their initiatives, especially if an element within DOE is expected to have major concerns with the EFCOG position.

Safety, Cost, and/or Schedule Benefit:
DOE already pays for the EFCOG. The level of benefit received by DOE appears to simply be a function of DOE's demands and expectations of the EFCOG.

Potential Idea Number: A13

Title/Description: Develop methods to assess, standardize, and focus limited EM safety basis expertise.

For years, the DNFSB has asserted that the DOE needs to provide additional emphasis on the quality and quantity of its technical staff. During this EM Study, insufficient numbers of qualified safety basis reviewers was identified as a recurring concern by most EM field offices. Due to the lack of standardized training and a defined minimum level of expertise for such reviewers, variability from site to site and even among individual reviewers at a single site in the interpretation of DOE safety basis standards is a common concern for DOE contractors. DOE previously successfully addressed a similar concern with its Facility Representatives in the 1992 to 1995 time frame.

Locations Already in Use	Key References	Key Personnel
N/A	DNFSB Recommendation 92-2 on DOE Facility Representatives	Tim Dwyer, DNFSB Staff
	DOE-STD-1063-2000, *Facility Representatives*	Joe Arango, EM-5 (former Headquarters Facility Representative Program Manager)

Candidate EM Sites for Use: All, although Oak Ridge probably has the most need

Actions Required to Implement:
1. Develop a minimum qualification standard for EM safety basis reviewers. Note that an EM-unique standard might include specialized areas of expertise, such as familiarity with key environmental regulations.
2. Assess EM Headquarters and field offices for sufficient numbers of qualified personnel. Take compensatory and corrective actions, as necessary.
3. Identify, develop, and make available a standard training curriculum for EM safety basis reviewers.
4. Identify opportunities for assembling a team of EM safety basis reviewers from multiple sites to work technically complex, time sensitive, or multisite safety basis documents.

Barriers to Implement:
With the possible exception of action item 4, the above actions will need to be approached as long-term investments for future improvements.

Safety, Cost, and/or Schedule Benefit:
Specific benefits were not estimated for this item, although the following benefits are expected:
1. Improved safety across the EM sites as consistent approaches and expectations are defined. This item might also facilitate the sharing of ideas and improvements advocated in Potential Idea A14.
2. Cost and schedule benefits are expected to accrue as DOE review and approval times are reduced and contractors become more consistent in their understanding and satisfaction of

DOE's safety basis expectations. A study by BBWI suggests that roughly half of its costs for developing and approving safety basis documents are consumed in the review process.

Potential Idea Number: A14

Title/Description: Create a DOE SAWG to parallel the EFCOG SAWG.

The EFCOG SAWG provides a forum for DOE contractor safety basis experts to share ideas, good practices, and lessons learned. Such a mechanism would be equally as valuable, or perhaps even more so, for DOE safety basis experts. DOE safety basis experts are fewer in number (most sites have one to six such persons) but can exert significant influence over the nature and quality of safety basis documents in the EM complex. Such a DOE working group could be modeled after the EFCOG SAWG or the methods used to tie together the DOE Facility Representative community.

Locations Already in Use	Key References	Key Personnel
	EFCOG SAWG Charter	Tammy Hobbes, BBWI
	DOE Facility Representative Program	Joe Arango, EM-5 (former Headquarters Facility Representative Program Manager)

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Develop a list of DOE safety basis experts. (Note: This is already largely available through existing contact lists in EM-5.)
2. Establish methods (such as periodic meetings, perhaps in conjunction with EFCOG SAWG workshops) to focus on issues and lessons learned that are unique to DOE safety basis reviewers.

Barriers to Implement:
Identification of a Headquarters champion with sufficient influence and access to funding to move this effort forward.

Safety, Cost, and/or Schedule Benefit:
While no specific estimates for this idea were made, the following benefits are expected:
1. Improved safety across the EM sites as consistent approaches and expectations are defined through the sharing of ideas and lessons learned between EM sites.
2. Cost and schedule benefits are expected to accrue as DOE's review and approval times are reduced and contractors become more consistent in their understanding and satisfaction of DOE's safety basis expectations. A study by BBWI suggests that roughly half of its costs for developing and approving safety basis documents are consumed in the review process.

Potential Idea Number: A15

Title/Description: Develop an integrated EM 10 CFR 830, Subpart B, implementation plan.

An EM-wide integrated implementation plan would permit identification of opportunities for safety basis resource sharing between EM sites. EM-5 has previously requested some 10 CFR 830, Subpart B, implementation details; however, these have not been requested in the form of a detailed, resource-loaded plan. NNSA has requested site-level implementation plans of its sites, and these could serve as templates.

Locations Already in Use	Key References	Key Personnel
N/A		Maria Gavrilas-Guinn, EM-5
		Dae Chung, NNSA

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Develop standard format and content requirements for site-level implementation plans. This would be expected to include resource loading for both DOE and contractor personnel, planned exemption requests, and budget and schedule information.
2. Request each EM site to provide its Subpart B implementation plan.
3. Integrate these site-level plans into an EM-wide implementation plan.

Barriers to Implement:
It is not clear that such an EM-wide plan could be assembled sufficiently in advance of the April 10, 2003, Subpart B due date to afford much opportunity for EM efficiencies to be identified.

Safety, Cost, and/or Schedule Benefit:
An integrated EM plan would permit the vectoring of limited EM safety basis expertise to areas of most programmatic importance and technical need. This would also permit EM senior management the opportunity to much more clearly articulate and defend their philosophy and approach to the issuance of 10 CFR 830, Subpart B, exemptions.

Potential Idea Number: A16

Title/Description: Develop EM complex-wide, compatible safety basis web sites to improve data sharing.

The creation of a standardized format for, and computer access to, EM safety basis documents would facilitate the sharing of issues, examples, and generic documents.

Locations Already in Use	Key References	Key Personnel
All sites currently employ a computer-based system to manage safety basis documentation.	For example, SAFETYNET at SRS	April Price, WSMS

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Identify the capabilities that currently exist and the standards used at each EM site.
2. Develop an EM-wide standard for use at all sites.
3. Develop and fund an implementation plan to transition sites to the new standard.

Barriers to Implement:
1. Given the safety vulnerabilities and consequence estimates provided in safety basis documents, ready access to these documents over the internet would likely present a homeland security vulnerability.
2. Standardization across the EM complex would need to be evaluated as to whether this action conflicted with any government contracting limitations.
3. Given that most sites have already substantially invested in their own computer-based hardware and software, obtaining consensus on the standards to be applied to all sites would be a challenge.

Safety, Cost, and/or Schedule Benefit:
A detailed cost-benefit analysis is needed to justify the expense of proceeding with this idea. The outcome of such an analysis is not obvious by inspection.

Potential Idea Number: A17

Title/Description: Clarify and reduce USQ recordkeeping requirements.

Title 10 CFR 830.6 requires USQ record keeping "to substantiate compliance." DOE G 424.1-1 (USQ Guide), Section 3.4, suggests USQ record retention for the life of the facility, but it does not address decommissioning USQs and does not address roll-up and removal of USQ records during DSA annual updates. (Annual DSA updates are required to incorporate any changes as a result of USQ determinations processed since the last DSA update.)

These requirements should be reexamined with a focus on the value added versus the burden imposed and to decide what USQ records are necessary after the operating phase of the facility is past. Each of the major EM sites identified that they annually produced 1,000+ USQ screenings per year and hundreds of USQ determinations.

Locations Already in Use	Key References	Key Personnel
All sites retain USQ files.		

Candidate EM Sites for Use: All

Actions Required to Implement:
1. Research and compile DOE's USQ record retention requirements.
2. Convene a working group of those who process and use USQ records (e.g., EM contractor USQ screeners and safety basis authors) to evaluate their needs and the value added of USQ records retention. This should specifically include persons involved with EM-unique missions, such as decommissioning and environmental remediation.
3. Develop draft amended USQ record retention requirements and incorporate them into DOE standards.

Barriers to Implement:
1. DOE records management Orders drive the retention duration for USQ files. These Orders would probably also require examination as part of this effort.
2. As this does not appear to have any obvious safety impact, the priority to expend safety basis resources on this effort would be low.

Safety, Cost, and/or Schedule Benefit:
1. There is no obvious safety benefit to this effort.
2. With thousands of USQ records being created each year, there is a definite administrative burden associated with the retention, although information technology continues to reduce the physical resources necessary to maintain electronic records.
3. The lack of clear requirements in the decommissioning area may result in potential future inefficiencies. For example, deactivation USQ records that justify the removal of key engineered features may be an important information source for decommissioning planning. Without these USQ records, the decommissioning planner may have to reconstitute the physical configuration, perform more extensive characterization, or proceed at a slower pace due to greater uncertainty with regard to the condition in which the facility was left.

Appendix J – Path Forward on Alternate Airborne Release Fractions

Appendix J
Path Forward on Alternate Airborne Release Fractions

Background

DOE Rule 10 CFR 830, Subpart B, requires the contractor responsible for a DOE nuclear facility to categorize the facility and, in some cases, to perform accident analysis. In performing both categorization and analysis, ARFs as defined in DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, and DOE-HDBK-3010-94, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities,* are utilized. ARFs are the coefficients used to estimate the amount of material suspended in the air as an aerosol following an accident (e.g., spills, fire, explosion, nuclear criticality, and earthquake).

Existing DOE standards do not currently address several material forms of interest to the EM Program (e.g., containerized wastes, fixed matrix forms such as concrete, and contaminated soils). As a result, categorization and analysis of EM facilities often requires the use of the default ARF values provided in DOE-STD-1027-92. (DOE-STD-1027-92 identifies four generic ARFs that are not accident-specific but are bounding for use in facility hazard categorization analyses.) These default values are, by necessity, conservative, and using them can result in categorizing a nuclear facility as representing a greater hazard than it really is.

EM attempted to define a set of alternate ARFs for materials of EM interest in the 1995-1996 time frame; however, this technical effort was never finalized, although it was documented in multiple versions of a draft DOE Standard (SAFT-0029). Subsequently, some EM sites have, on a case-by-case basis, developed alternate ARFs for specific facilities, waste forms, and configurations. This approach is inefficient and vulnerable to inconsistency. Other EM sites have utilized the draft SAFT-0029 unfinalized values in certain facility hazard categorization and accident analyses. These sites are vulnerable to oversight findings if they have not developed supplemental technical bases.

Review of Current Situation

As part of the EM 10 CFR 830, Subpart B, Implementation Study, the subject of alternate ARFs resurfaced and was examined to determine how best to proceed. There is no obvious path forward that enjoys support from all of the involved parties. Only the following points are certain:

1. Any decision, including no decision, will effect EM's 10 CFR 830, Subpart B, implementation schedule.

2. The interests and arguments that generated the original SAFT-0029 ARF values are still valid, although there is renewed enthusiasm due to 10 CFR 830, Subpart B. The EM sites' primary interest in the draft SAFT-0029 ARFs is for hazard categorization purposes.

3. The draft SAFT-0029 values must still withstand technical peer review, which may invalidate some or all of these values.

4. The draft SAFT-0029 alternate ARFs treat the waste container as part of the waste form. This is viewed by EH-53 as inconsistent with the hazard categorization methodology of DOE-STD-1027-92, which does not permit crediting of engineered barriers in the "unmitigated release." (EH-53 is the author, interpreter, and office of primary interest for DOE-STD-1027-92.) EM believes that it can articulate an argument that the waste containers should be treated as an inherent part of the waste form for hazard categorization purposes.

5. A standard method/model for demonstrating how to assess a facility against the Hazard Category 3 dose criterion of DOE-STD-1027-92 must still be finalized by EH-53. Without this method/model, alternate ARFs may only be used to justify moving facilities between Hazard Category 2 and 3, not to below Hazard Category 3.

Possible Options and Recommendation

Based on discussions and correspondence with the involved parties and persons previously involved with the draft SAFT-0029 development process, a set of options (see the table on the next page) was developed for EM management's consideration. In a meeting with the EM Director of Environment, Safety, and Health (EM-5) on May 16, 2002, option 5 (i.e., perform technical peer review of the draft SAFT-0029 ARFs) was recommended by the EM study author. EM-5 agreed with certain conditions passed on to the task leader.

Path Forward

The EM task leader for this effort is Mr. Joseph Arango, EM-5. EM intends to utilize the technical peer review process of the American Society of Mechanical Engineers (ASME) Institute for Regulatory Science (see the web site at http://www.nars.org/) for this task. As part of the EM study, funding was acquired to accomplish this task.

Airborne Release Fractions – Potential EM Options

#	Description of Options	Pros	Cons
1	Do nothing.	• No effort or expense required.	• Potential safety risk though believed to be minor. • EM sites remain vulnerable.
2	Invalidate the use of SAFT-0029 ARFs without additional local technical basis development.	• Technically and legally defensible. • EH-53 would support.	• "Creates" dozens of new nuclear facilities subject to 10 CFR 830. The cost to comply would probably exceed $1M. • May ultimately not be technically necessary. • Some EM sites would strongly resist.
3	Do more cost-benefit analysis to support this decision.	• Potential benefits of using alternate ARFs are not well quantified. Would allow for a better decision.	• Given the uncertainties in using alternate ARFs, additional estimates may be unreliable. • Not timely to support 10 CFR 830 implementation.
4	Defer a decision for up to six weeks or until the EM inactive waste site recategorization memorandum is dispositioned.	• Would provide insight on how hard it is to argue crediting other regulatory regimes (i.e., can environmental regulations be depended upon to assure that waste drums remain intact). • Still allows for a timely decision.	• Potential loss of EM momentum and interest. • The EM inactive waste site memorandum may not reach closure in six more weeks. Additionally, even if the inactive waste site memorandum fails, SAFT-0029 values continue to be used in the field without sufficient basis, and this demands technical resolution.
5	Proceed with a technical peer review of all five SAFT-0029 ARFs utilizing the ASME Institute for Regulatory Science.	• Consistent with SAFT-0029 structure. • Most timely solution. • Permits an impartial third party to technically resolve whether the SAFT-0029 ARFs are reasonable and justified.	• DOE-STD-1027 and EH-53 do not agree with premise of the SAFT-0029 ARFs (i.e., the container is part of the waste form). • EH-53 is skeptical that ASME Institute for Regulatory Science can deliver a sufficient quality product. The onus is on EM to demand rigor/quality. • Estimated cost of $200K.
6	Proceed with a technical peer review of two ARFs that envelope the five SAFT-0029 ARFs.	• Conceptually simpler to focus on only two values versus five. • Permits more data in existing data set to be used in support of each ARF.	• Would not support needs of EM sites which have already used SAFT-0029 values. • SAFT-0029 technical basis would require repackaging to support only two values; it is not clear who would do this.
7	Assemble a DOE in-house panel to further develop and disposition the SAFT-0029 ARFs.	• EH-53 supports this option. • Allows entirety of SAFT-0029 values to be revisited.	• Not clear to be any more successful than the last six years. • Does not afford the opportunity to bring in "fresh blood" with outside talent, perspectives, and references. • Not timely to support 10 CFR 830 implementation.

Appendix K – Quality Expectations for Energy Facility Contractors Group Products

Appendix K
Quality Expectations for Energy Facility Contractors Group Products

The Energy Facility Contractors Group (EFCOG) is a volunteer organization that is directed by senior-level executives from DOE contractors, sustained by working level personnel from member contractors, and supported and funded by DOE. The EFCOG provides a forum for information exchange through the activities of eight different working groups. The EFCOG Safety Analysis Working Group (SAWG) promotes excellence in DOE safety analysis programs through coordinating and facilitating the exchange of successful safety analysis programs, practices, procedures, lessons learned, etc. The SAWG also promotes training on safety analysis through workshops, subgroups, and seminars. In performing its function, the SAWG periodically generates documents that discuss the implementation and interpretation of DOE safety basis policy and standards.

The EM 10 CFR 830, Subpart B, Implementation Study examined means to find a more effective role for using the expertise of the EM contractor community. This effort quickly led to examining the EFCOG SAWG. As part of the review of the EFCOG SAWG, several concerns were identified:

1. The Federal Advisory Committee Act (5 United States Code, Appendix 2) places constraints on how the government can solicit advice on regulatory matters. In particular, the Federal Advisory Committee Act is intended to keep government policymaking from being insulated from public scrutiny and affording contractors with vested interests undue influence.

2. DOE (e.g., EH-53) expressed concerns over the consistency in quality of the products produced by the EFCOG SAWG. In addition, DOE expressed a concern over how the EFCOG controls the use of its products after issuance, especially if DOE disagrees with the content of the product.

3. There is philosophical disagreement within DOE as to whether the EFCOG should publish final positions without first having DOE review and comment on them. The fact that DOE funds the EFCOG lends a basis to those in DOE who want a voice in the EFCOG's products.

The study attempted to deal with item 2 above, with the view that item 1 could be addressed through appropriate protocols between DOE and the EFCOG and that item 3 was somewhat dependent on the results of item 2.

In corresponding with the EFCOG Administrative Director, the following quality expectations for EFCOG products were discussed. This list is not all inclusive.

- The EFCOG's quality control processes must be formally promulgated, adhered to, and reside in a permanent, controlled location.

- The EFCOG must clearly define what its products represent with regard to the level of technical concurrence of the EFCOG or working group members. The idea was offered of

having several levels of EFCOG products, each corresponding to a different level of concurrence (e.g., 50% or 90% of the working group) or alternatively using a process similar to that used in the generation of national consensus standards.

- The EFCOG must define a mechanism for addressing dissenting technical opinions that affords product recipients the opportunity to know of these concerns.

- The EFCOG must be sufficiently invested to technically support and defend its products without depending upon DOE's review or concurrence. As part of this, the EFCOG and its working groups should attempt to reflect complex-wide interests and not become overly aligned with any particular DOE office.